SOIL SURVEY OF

Campbell County and City of Lynchburg, Virginia

United States Department of Agriculture
Soil Conservation Service
in cooperation with
Virginia Polytechnic Institute and State University

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1963-71. Soil names and descriptions were approved in 1973. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1971. This survey was made cooperatively by the Soil Conservation Service and the Virginia Polytechnic Institute and State University. It is part of the technical assistance furnished to the Robert E. Lee Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All of the soils of Campbell County and the city of Lynchburg are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the survey area in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the woodland group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the descriptions of the capability units and the woodland groups.

Foresters and others can refer to the section "Woodland," where the soils of the survey area are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings and industrial buildings and for recreation areas in the section "Town and Country Planning."

Engineers and builders can find, under "Engineering," tables that contain estimates of soil properties and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Campbell County and the city of Lynchburg may be interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the survey area given in the section "Environmental Factors Affecting Soil Use."

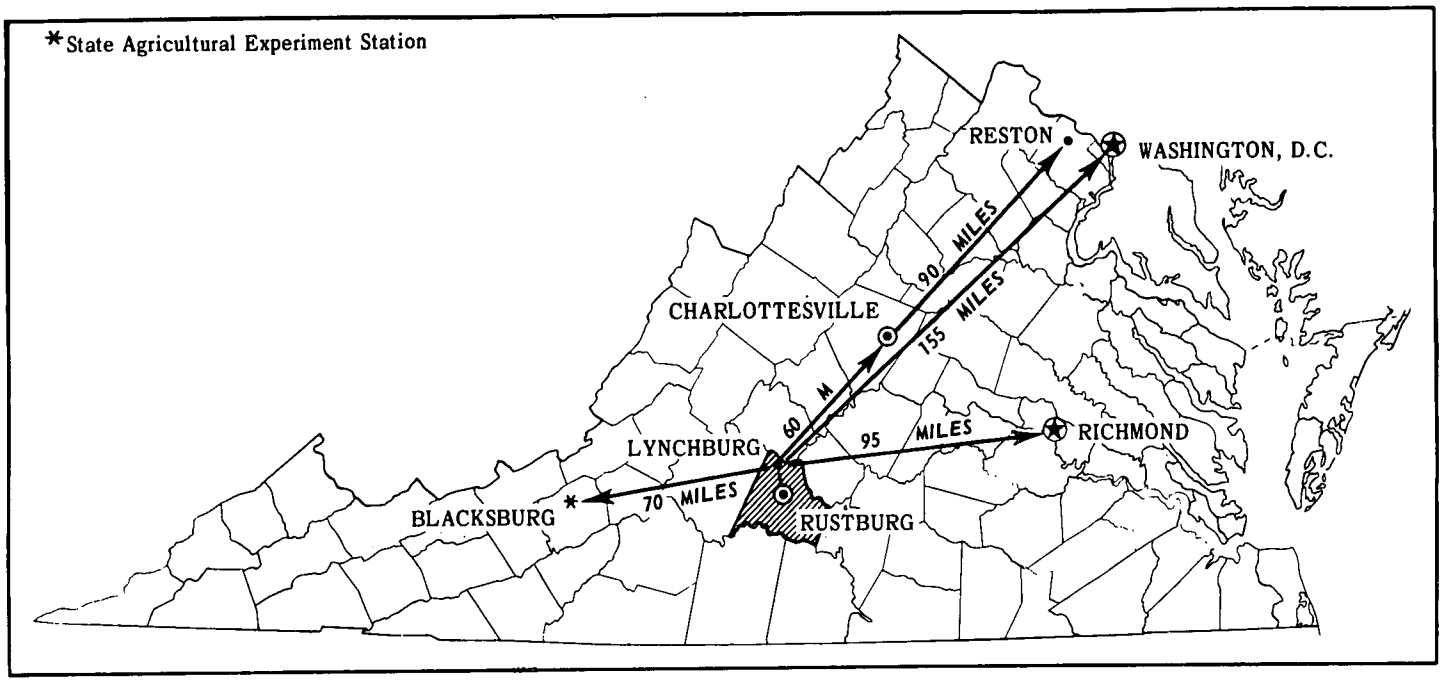
***Cover*: General farming on the Cullen-Wilkes association in the foreground. The Tatum-Manteo-Nason association, in the background, is used mostly as woodland.**

Contents

Issued March 1977

Index to Mapping Units

Summary of Tables



Location of Campbell County and the city of Lynchburg in Virginia.

SOIL SURVEY OF CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA

BY CECIL F. BULLARD, JR.

FIELDWORK BY CECIL F. BULLARD, JR., KENNETH E. FUSSELL, STUART J. LARSON, JERRY C. MCDANIEL, WILLIAM F. SLEDJESKI, D. LARRY SMITH, AND WILLIAM E. THOMAS, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

CAMPBELL COUNTY AND THE CITY OF LYNCHBURG are in the south-central part of Virginia. They are bordered on the north by the James River, on the east by Appomattox and Charlotte Counties, on the south by the Roanoke River, and on the west by Bedford County (see facing page). They have an area of 554 square miles, or 354,560 acres. The population of Campbell County in 1970 was 43,319, and the population of the city of Lynchburg was 54,083.

Campbell County and the city of Lynchburg are on the Piedmont Plateau, a landform of gently rolling to rolling topography, underlain mainly by metamorphic rock formations and to a lesser extent by sedimentary and igneous rock formations. Most of the soils of this survey area formed in the weathered products of these rocks.

Farming is the main land use in the survey area, although urban expansion outward from the city of Lynchburg and other population centers is replacing farming with housing, industry, and shopping centers. Most of the farms produce corn, small grain, and mixed hay, which is commonly fed to livestock on the farm. Tobacco is the major cash crop. Beef cattle and dairy cattle are the major livestock enterprises, but hogs, sheep, horses, and poultry are also raised.

About 67 percent of the survey area is wooded, and wood-related industries are an important part of the economy of the area.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Campbell County and the city of Lynchburg, where they are located, and how they can be used (*9*).[1] The soil scientists went into the survey area knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Appling and Tatum, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Appling fine sandy loam, 2 to 6 percent slopes, is one of several phases within the Appling series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a map-

[1] Italic numbers in parentheses refer to Literature Cited, p. 119.

ping unit is nearly equivalent to a soil phase. It is not exactly equivalent because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Campbell County and the city of Lynchburg: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils so intricately mixed or so small that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Appling-Wedowee gravelly sandy loams, 15 to 25 percent slopes, eroded, is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map can be made up of only one of the dominant soils, or of two or more. If there are two or more dominant series represented in the group, the name of the group ordinarily consists of the names of the dominant soils, joined by "and." Wahee and Augusta loams is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names, such as Cut and fill land.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing medium for native and cultivated plants and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this failure to slow permeability or a high water table. They see that streets, road pavements, and foundations for houses are cracked on a given kind of soil, and they relate this failure to a high shrink-swell potential. Thus, they use observation and knowledge of soil properties, together with available research data, to predict the limitations or suitability of a soil for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their study and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Campbell County and the city of Lynchburg. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association can occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in survey area, who want to compare different parts of a survey area, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field or for selecting the exact location of a road, building, or similar structure because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

Soil associations on the general soil map for this survey area join those on the general soil map of Charlotte County, except in the southeastern part along the Roanoke River. An association in Charlotte County was not delineated because of its small extent in Campbell County.

The seven soil associations in Campbell County and the city of Lynchburg are described on the following pages.

1. Cecil-Appling association

Deep, well-drained, gently sloping to moderately steep soils that have a dominantly firm clayey subsoil; on uplands

This association is on broad ridges, side slopes, and narrow flood plains. On broad ridges the slope is dominantly 2 to 15 percent. On side slopes it ranges from 6 to 25 percent. Near the larger drainageways, the ridges are narrower and the side slopes are steeper, commonly 15 to 60 percent. On narrow flood plains, which are along the larger streams, the slope is dominantly 0 to 6 percent.

This association occurs as nine scattered areas and makes up about 29 percent of the survey area. It is 51 percent Cecil soils, 15 percent Appling soils, and 34 percent less extensive soils.

Cecil soils are on ridges and side slopes. They are deep, well-drained, moderately permeable soils that have a dominantly clayey subsoil. Appling soils are on ridges, but are more commonly on side slopes. They are deep, well-drained, moderately permeable soils that have a dominantly clayey subsoil.

Among the less extensive soils are Abell, Chewacla, Cullen, Dogue, Enon, Fluvanna, Helena, Hiwassee, Iredell, Louisburg, Masada, Riverview, State, Toccoa, Turbeville, Vance, Wedowee, Wehadkee, Wilkes, and Worsham soils and Urban land. Abell, State, and Worsham soils are in low areas at the heads of drainageways and along drainageways. Chewacla, Riverview, Toccoa, and Wehadkee soils are on flood plains and are flooded regularly. Cullen, Enon, Fluvanna, Helena, Hiwassee, Masada, Turbeville, Wedowee, and Vance soils are in positions similar to those of Cecil and Appling soils. Some Masada and State soils, as well as Dogue soils, are on terraces along the streams. Iredell soils are on broad ridges and the milder side slopes. Louisburg and Wilkes soils are on the steeper slopes near the larger drainageways and streams. Urban land is in the city of Lynchburg, where the soils have been used for commercial and residential construction.

Most of this association has been farmed, but some of it is now woodland. Much of the association is used for general farming (fig. 1). Corn, small grain, soybeans, bright tobacco, dark tobacco, hay, and pasture are the chief crops. Beef cattle is the major livestock enterprise. There is some dairying. Areas of this association near Altavista and Lynchburg are under urban development.

2. *Appling-Louisburg association*

Deep and moderately deep, well drained to excessively drained, gently sloping to steep soils that have a dominantly clayey or loamy subsoil; on uplands

This association is on broad ridges, side slopes, and narrow flood plains in the eastern part of the survey area. On broad ridges the slope is dominantly 2 to 15 percent. On side slopes it ranges from 6 to 25 percent. Near the larger drainageways and streams, the ridges are narrower and the side slopes are steeper, commonly 15 to 60 percent. On narrow flood plains, which are along the larger streams, the slope is dominantly 0 to 6 percent.

This association makes up about 9 percent of the survey area. It is 40 percent Appling soils, 12 percent Louisburg soils, and 48 percent less extensive soils.

Appling soils are on ridges and the milder side slopes. They are deep, well-drained, moderately per-

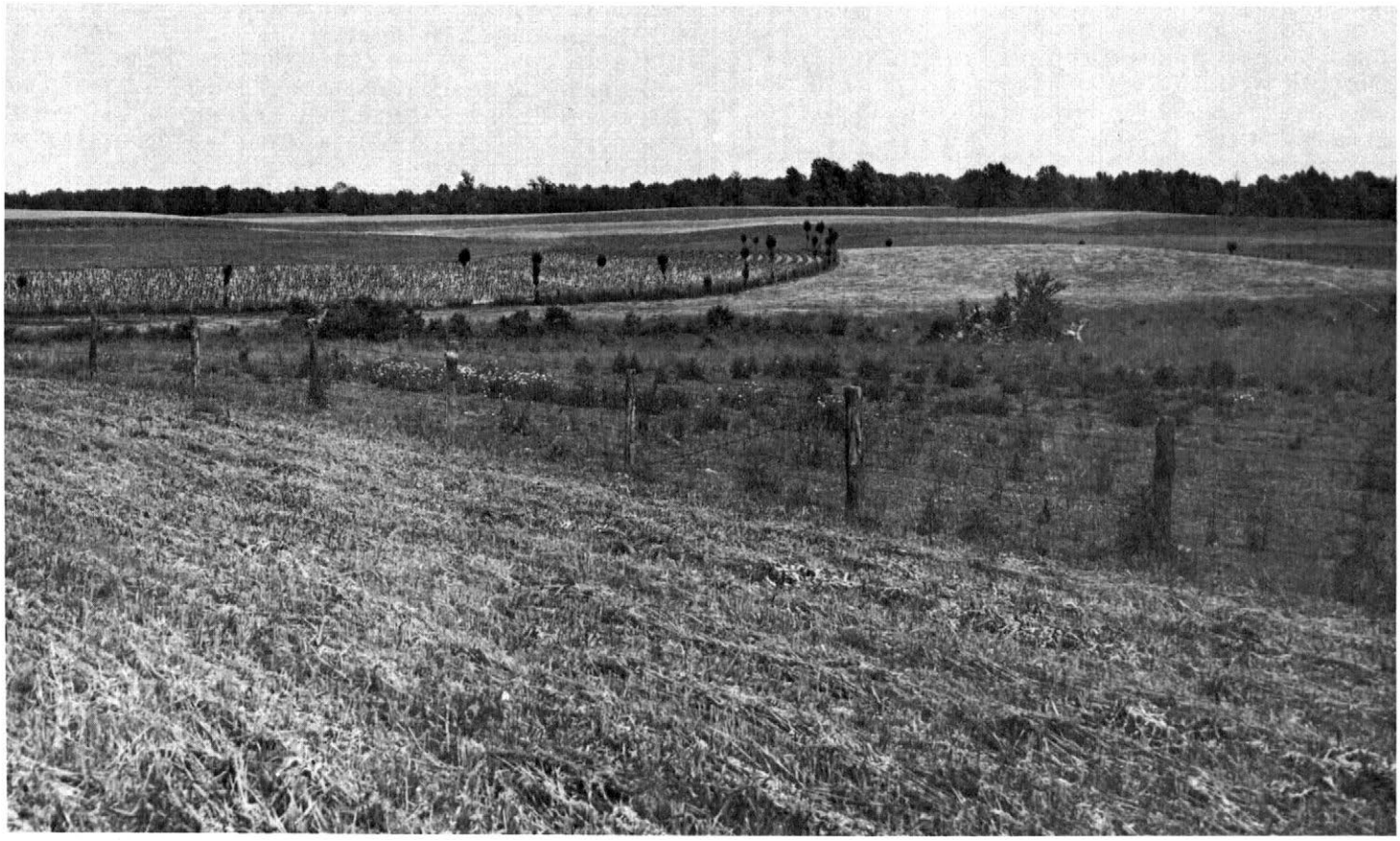


Figure 1.—General farming on broad, gently sloping and sloping ridges and mild side slopes of the Cecil-Appling association. Chewacla and Toccoa soils are along the drainageway.

meable soils that have a dominantly clayey subsoil. Louisburg soils are commonly on the steeper side slopes along drainageways and streams. They are moderately deep, somewhat excessively drained to excessively drained, rapidly permeable soils that have a loamy subsoil.

Of the less extensive soils, Tatum soils make up about 5 percent of the association and Manteo soils 3 percent. These soils are in a narrow belt that extends north and south through the center of the association. Tatum soils are in positions similar to those of Appling soils, and Manteo soils are in positions similar to those of Louisburg soils.

Among the other less extensive soils are Abell, Cecil, Chewacla, Cullen, Dogue, Hiwassee, Masada, Nason, State, Toccoa, Turbeville, Vance, Wehadkee, and Wilkes soils. Abell soils are in low areas at the heads of drainageways and along drainageways. Cecil, Cullen, Hiwassee, Masada, Turbeville, and Vance soils are in positions similar to those of Appling soils. Chewacla, Toccoa, and Wehadkee soils are on flood plains and are flooded regularly. Dogue, State, and some Masada soils are on terraces along streams. Nason soils are in positions similar to those of Tatum soils. Wilkes soils are in positions similar to those of Louisburg soils.

Most ridges on the association have been farmed, but some are now wooded. The association is suited to bright tobacco, which is grown mainly on Appling soils. Other crops are corn, small grain, dark tobacco, hay, and pasture. Beef cattle is the main livestock enterprise. Areas of this association near Brookneal are under urban development.

3. *Madison-Tallapoosa association*

Deep and moderately deep, well-drained, gently sloping to steep soils that have a dominantly clayey or loamy subsoil; on uplands

This association is on somewhat broad to narrow ridges, side slopes, and narrow flood plains in the southeastern part of the survey area. On the ridges the slope is dominantly 2 to 15 percent. On side slopes it ranges from 6 to 25 percent. Near the larger drainageways and streams, it ranges to 60 percent. On narrow flood plains, which are along the larger streams, the slope is dominantly 0 to 6 percent.

This association occurs as three small areas and makes up about 3 percent of the survey area. It is 42 percent Madison soils, 22 percent Tallapoosa soils, and 36 percent less extensive soils.

Madison soils are on ridges and the milder side slopes. They are deep, well-drained, moderately permeable soils that have a dominantly clayey subsoil. Tallapoosa soils are on side slopes, especially the steeper side slopes along the larger drainageways and streams. They are moderately deep to deep, well-drained, moderately permeable soils that have a loamy subsoil.

Among the less extensive soils are Buncombe, Chewacla, Cullen, Dogue, Hiwassee, Masada, Riverview, State, Toccoa, Turbeville, Wehadkee, and Worsham soils. Buncombe, Chewacla, Riverview, Toccoa, and Wehadkee soils are on flood plains and are flooded regularly. Cullen, Hiwassee, Masada, and Turbeville soils are in positions similar to those of Madison soils. Dogue and State soils, and some Masada and Turbeville soils, are on terraces along the streams. Worsham soils are in low areas at the heads of drainageways and along drainageways.

Much of this association is wooded, but some of it is used for general farming. Corn, soybeans, small grain, dark tobacco, hay, and pasture are the chief crops. Beef cattle is the major livestock enterprise. There is some dairying.

4. *Cullen-Wilkes association*

Deep and moderately deep, well-drained, gently sloping to steep soils that have a dominantly clayey subsoil; on uplands

This association is on broad ridges, side slopes, and narrow flood plains. On broad ridges the slope is dominantly 2 to 15 percent. On side slopes it ranges from 6 to 25 percent. Near the larger drainageways and streams, the ridges are narrower and the side slopes are steeper, commonly 15 to 60 percent. On narrow flood plains, which are along the larger streams, the slope is dominantly 0 to 6 percent.

This association makes up about 25 percent of the survey area. It is 43 percent Cullen soils, 17 percent Wilkes soils, and 40 percent less extensive soils.

Cullen soils are on ridges and side slopes. They are deep, well-drained, moderately permeable soils that have a dominantly clayey subsoil. Wilkes soils are mainly on side slopes, but are also on some of the narrower ridges. They are moderately deep, well-drained soils that have a dominantly clayey subsoil and moderately slow permeability.

Of the less extensive soils, Iredell soils make up about 3 percent of the association. These soils are on broad to very broad ridges and the milder side slopes.

Among the other less extensive soils are Bremo, Brockroad, Cecil, Chewacla, Elbert, Enon, Fluvanna, Georgeville, Gwinnett, Helena, Louisburg, Madison, Manteo, Masada, Mecklenburg, Nason, Riverview, Tatum, Toccoa, Turbeville, Vance, and Wehadkee soils and Urban land. Bremo, Louisburg, and Manteo soils are in the steeper areas along the larger drainageways and streams. Brockroad, Cecil, Enon, Fluvanna, Georgeville, Gwinnett, Madison, Masada, Mecklenburg, Nason, Tatum, Turbeville, and Vance soils are in positions similar to those of Cullen soils. In places Masada and Turbeville soils are on terraces along streams. Chewacla, Riverview, Toccoa, and Wehadkee soils are on flood plains and are flooded regularly. Elbert soils are on upland flats, in slight depressions, and at the heads of drainageways. Helena soils are in positions similar to those of Iredell soils. Urban land is in the city of Lynchburg, where the soils have been used for commercial and residential construction.

Most of this association has been farmed, but many areas are now wooded. Much of the association is used for general farming. Corn, soybeans, small grain, dark

tobacco, hay, and pasture are the main crops. Beef cattle and dairying are the main livestock enterprises. Areas of this association near Altavista and Lynchburg are under urban development.

5. Tatum-Manteo-Nason association

Deep and shallow, well drained and somewhat excessively drained, gently sloping to steep soils that have a dominantly clayey or loamy subsoil; on uplands

This association is on somewhat broad to narrow ridges, side slopes, and narrow flood plains. On the ridges the slope is dominantly 2 to 15 percent. On side slopes it ranges from 6 to 25 percent. Near the larger drainageways and streams and in mountainous areas, the ridges are narrower and the side slopes are steeper, commonly 15 to 60 percent. On narrow flood plains, which are along the larger streams, the slope is dominantly 0 to 6 percent.

This association occurs as six scattered areas and makes up about 19 percent of the survey area. It is 36 percent Tatum soils, 23 percent Manteo soils, 13 percent Nason soils, and 28 percent less extensive soils.

Tatum and Nason soils are on ridges and side slopes. They are deep, well-drained, moderately permeable soils that have a dominantly clayey subsoil. Manteo soils are on the steeper side slopes along the larger drainageways and streams, in the steeper mountainous areas, and on a few of the narrower ridges. They are shallow, somewhat excessively drained soils that have a loamy subsoil and moderately rapid permeability.

Among the less extensive soils are Abell, Cecil, Chewacla, Cullen, Georgeville, Louisburg, Masada, Riverview, Toccoa, Wehadkee, Wilkes, and Worsham soils. Abell and Worsham soils are at the heads of drainageways and along drainageways. Cecil, Cullen, Georgeville, and Masada soils are in positions similar to those of Tatum and Nason soils. In places Masada soils are on terraces along the larger streams. Chewacla, Riverview, Toccoa, and Wehadkee soils are on flood plains and are flooded regularly. Louisburg and Wilkes soils are in positions similar to those of Manteo soils.

Most of this association is wooded, but some of the broader ridges and milder side slopes are used for general farming. Corn, soybeans, small grain, dark tobacco, hay, and pasture are the main crops. Beef cattle is the main livestock enterprise, but there are a few dairies. Areas of this association near Lynchburg are under urban development.

6. Georgeville-Tatum association

Deep, well-drained, gently sloping to moderately steep soils that have a friable, dominantly clayey subsoil; on uplands

This association is on broad ridges, side slopes, and narrow flood plains. On broad ridges the slope is dominantly 2 to 6 percent. On side slopes it ranges from 6 to 25 percent. Near the larger drainageways and streams, the ridges are narrower and the side slopes are steeper. On narrow flood plains, which are along the larger streams, the slope is dominantly 0 to 6 percent.

This association occurs as seven scattered areas and makes up about 9 percent of the survey area. It is 50 percent Georgeville soils, 18 percent Tatum soils, and 32 percent less extensive soils.

Georgeville and Tatum soils are on ridges and side slopes. They are deep, well-drained, moderately permeable soils that have a dominantly clayey subsoil.

Of the less extensive soils, Manteo soils make up about 9 percent of the association. They are in the steeper areas near the larger drainageways and streams.

Among the other less extensive soils are Abell, Cecil, Chewacla, Cullen, Herndon, Louisburg, Masada, Toccoa, Turbeville, Wehadkee, Wilkes, and Worsham soils. Abell and Worsham soils are on low areas at the heads of drainageways and along drainageways. Cecil, Cullen, Herndon, Masada, and Turbeville soils are in positions similar to those of Georgeville and Tatum soils. Chewacla, Toccoa, and Wehadkee soils are on flood plains and are flooded regularly. Louisburg and Wilkes soils are in positions similar to those of Manteo soils.

Most of this association has been farmed, but some areas are now wooded. Much of the association is used for general farming. Corn, soybeans, small grain, dark tobacco, hay, and pasture are the main crops. Beef cattle is the main livestock enterprise.

7. Mayodan-Penn-White Store association

Deep and moderately deep, well drained to somewhat poorly drained, nearly level to moderately steep soils that have a dominantly clayey or loamy subsoil; on uplands

This association is in the east-central part of the survey area. It is mostly on broad ridges, side slopes, and narrow flood plains. A broad, low-lying area extends from north to south through the center of the association. In the low-lying area the slope is dominantly 0 to 6 percent. In the surrounding, higher areas of broad ridges, it is dominantly 2 to 6 percent. On side slopes it is 6 to 15 percent. Near large drainageways and streams, the ridges are narrower and the side slopes are steeper, commonly as much as 25 percent. On narrow flood plains, which are along the larger streams, the slope is dominantly 0 to 6 percent.

This association makes up about 6 percent of the survey area. It is 32 percent Mayodan soils, 16 percent Penn soils, 10 percent White Store soils, and 42 percent less extensive soils.

Mayodan soils are on ridges and side slopes in the higher areas. They are deep, well-drained, moderately permeable soils that have a clayey subsoil. Penn soils are in broad, low-lying areas and on ridges and side slopes. They are moderately deep, well-drained soils that have a loamy subsoil and moderate to moderately rapid permeability. White Store soils are in broad, low-lying areas. They are moderately deep to deep, moderately well drained to somewhat poorly drained soils that have a clayey subsoil and very slow permeability.

Of the less extensive soils, Pinkston soils make up about 7 percent of the association. They are on side slopes in the higher areas of the association.

Among the other less extensive soils are Abell, Chewacla, Elbert, Masada, Toccoa, Turbeville, Wehadkee, and Worsham soils. Abell and Worsham soils are in low areas at the heads of drainageways and along drainageways. Chewacla, Toccoa, and Wehadkee soils are on flood plains and are flooded regularly. Elbert soils are in positions similar to those of White Store soils, and Masada and Turbeville soils are in positions similar to those of Mayodan soils.

Most low-lying areas of the association are in woodland or pasture. The higher areas are used for general farming. Corn, soybeans, small grain, bright tobacco, dark tobacco, hay, and pasture are the main crops. Beef cattle is the main livestock enterprise.

Descriptions of the Soils

This section describes the soil series and mapping units in Campbell County and the city of Lynchburg. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. Color terms are for moist soil unless otherwise stated. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit. Unless otherwise indicated, coarse fragments are reported as a percentage of the total volume of the soil material.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Cut and fill land and Urban land, for example, do not belong to a soil series, but nevertheless, are listed in alphabetic order along with the soil series.

Preceding the name of each mapping unit is a symbol. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland group in which the mapping unit has been placed. The page for the description of each capability unit can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*9*).

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent	Soil	Acres	Percent
Abell fine sandy loam, 0 to 4 percent slopes	4,058	1.1	Cecil clay loam, 15 to 25 percent slopes, severely eroded	644	.2
Abell loam, 0 to 4 percent slopes	721	.2	Chewacla loam	1,546	.4
Appling gravelly sandy loam, 2 to 6 percent slopes	2,277	.6	Chewacla-Toccoa complex	10,318	3.0
Appling gravelly sandy loam, 6 to 15 percent slopes	3,066	.9	Cullen loam, 2 to 6 percent slopes	12,378	3.5
Appling fine sandy loam, 2 to 6 percent slopes	5,887	1.7	Cullen loam, 6 to 15 percent slopes, eroded	17,338	5.1
Appling fine sandy loam, 6 to 15 percent slopes, eroded	11,541	3.3	Cullen loam, 15 to 25 percent slopes, eroded	5,858	1.7
Appling-Wedowee gravelly sandy loams, 15 to 25 percent slopes, eroded	1,204	.3	Cullen clay loam, 2 to 6 percent slopes, severely eroded	1,458	.4
Appling-Wedowee fine sandy loams, 15 to 25 percent slopes, eroded	4,901	1.4	Cullen clay loam, 6 to 15 percent slopes, severely eroded	3,918	1.1
Bremo loam, 6 to 15 percent slopes	736	.2	Cullen clay loam, 15 to 25 percent slopes, severely eroded	1,867	.5
Bremo loam, 15 to 25 percent slopes	876	.3	Cut and fill land	574	.2
Bremo loam, 25 to 60 percent slopes	425	.1	Dogue fine sandy loam, 0 to 2 percent slopes	233	(1)
Buncombe loamy fine sand	565	.2	Dogue fine sandy loam, 2 to 6 percent slopes	902	.3
Cecil fine sandy loam, 2 to 6 percent slopes, eroded	18,813	5.3	Elbert loam	1,073	.3
Cecil fine sandy loam, 6 to 15 percent slopes, eroded	26,784	7.6	Enon fine sandy loam, 2 to 6 percent slopes	1,052	.3
Cecil fine sandy loam, 15 to 25 percent slopes, eroded	8,899	2.5	Enon fine sandy loam, 6 to 10 percent slopes, eroded	1,558	.4
Cecil cobbly fine sandy loam, 6 to 15 percent slopes	601	.2	Fluvanna fine sandy loam, 2 to 6 percent slopes, eroded	200	(1)
Cecil clay loam, 2 to 6 percent slopes, severely eroded	470	.1	Fluvanna fine sandy loam, 6 to 15 percent slopes, eroded	495	.1
Cecil clay loam, 6 to 15 percent slopes, severely eroded	1,636	.5	Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded	322	(1)

TABLE 1.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Acres	Percent
Forestdale silt loam	167	(1)
Georgeville loam, 2 to 6 percent slopes, eroded	7,676	2.2
Georgeville loam, 6 to 15 percent slopes, eroded	8,918	2.5
Georgeville loam, 15 to 25 percent slopes, eroded	1,466	.4
Georgeville-Brockroad loams, 2 to 6 percent slopes	1,491	.4
Gwinnett clay loam, thick solum variant, 2 to 6 percent slopes	577	.2
Gwinnett clay loam, thick solum variant, 6 to 15 percent slopes	422	.1
Helena fine sandy loam, 2 to 6 percent slopes	882	.3
Helena fine sandy loam, 6 to 15 percent slopes	272	(1)
Herndon loam, 2 to 6 percent slopes	367	.1
Herndon loam, 6 to 10 percent slopes	223	(1)
Hiwassee loam, 2 to 6 percent slopes, eroded	1,345	.4
Hiwassee loam, 6 to 15 percent slopes, eroded	1,707	.5
Hiwassee loam, 15 to 25 percent slopes, eroded	241	(1)
Iredell loam, 2 to 6 percent slopes	3,082	.9
Iredell loam, 2 to 6 percent slopes, eroded	220	(1)
Iredell loam, 6 to 10 percent slopes	965	.3
Iredell loam, 6 to 10 percent slopes, eroded	228	(1)
Louisburg fine sandy loam, 6 to 15 percent slopes	1,319	.4
Louisburg fine sandy loam, 15 to 25 percent slopes	3,031	.9
Louisburg fine sandy loam, 25 to 60 percent slopes	2,263	.7
Madison loam, 2 to 6 percent slopes, eroded	901	.3
Madison loam, 6 to 15 percent slopes, eroded	3,516	1.0
Madison loam, 15 to 25 percent slopes, eroded	2,645	.8
Manteo channery loam, 6 to 15 percent slopes	2,716	.8
Manteo channery loam, 15 to 25 percent slopes	7,109	2.0
Manteo channery loam, 25 to 60 percent slopes	12,047	3.4
Manteo-Rock outcrop complex, steep	326	(1)
Masada fine sandy loam, 2 to 6 percent slopes	3,722	1.1
Masada fine sandy loam, 6 to 15 percent slopes	2,451	.7
Masada gravelly fine sandy loam, 2 to 6 percent slopes	538	.2
Masada gravelly fine sandy loam, 6 to 10 percent slopes	313	(1)
Masada loam, 2 to 6 percent slopes, eroded	645	.2
Masada loam, 6 to 12 percent slopes, eroded	404	.1
Masada loam, local alluvium, 0 to 4 percent slopes	3,129	.9
Mayodan fine sandy loam, 2 to 6 percent slopes	2,983	.8
Mayodan fine sandy loam, 6 to 15 percent slopes	2,695	.7
Mayodan loam, 2 to 6 percent slopes, eroded	1,204	.4
Mayodan loam, 6 to 15 percent slopes, eroded	792	.2
Mecklenburg loam, 2 to 6 percent slopes, eroded	1,065	.3
Mecklenburg loam, 6 to 15 percent slopes, eroded	2,813	0.8
Mecklenburg loam, 15 to 25 percent slopes, eroded	596	.2
Nason loam, 2 to 6 percent slopes	1,029	.3
Nason loam, 6 to 15 percent slopes	6,551	1.9
Nason loam, 15 to 25 percent slopes	5,886	1.7
Penn silt loam, 0 to 2 percent slopes	764	.2
Penn silt loam, 2 to 6 percent slopes	1,639	.5
Penn silt loam, 6 to 15 percent slopes	720	.2
Pinkston fine sandy loam, 2 to 6 percent slopes	234	(1)
Pinkston fine sandy loam, 6 to 15 percent slopes	763	.2
Pinkston and Penn soils, 15 to 25 percent slopes	1,095	.3
Quarry, mine	227	(1)
Riverview loam	1,657	.5
Roanoke silt loam, local alluvium	425	.1
State fine sandy loam, 0 to 2 percent slopes	495	.1
State fine sandy loam, 2 to 6 percent slopes	209	(1)
Tallapoosa loam, 6 to 15 percent slopes	376	.1
Tallapoosa loam, 15 to 25 percent slopes	1,469	.4
Tallapoosa loam, 25 to 60 percent slopes	1,563	.4
Tatum loam, 2 to 6 percent slopes	7,038	2.2
Tatum loam, 6 to 15 percent slopes, eroded	19,226	5.4
Tatum loam, 15 to 25 percent slopes, eroded	8,842	2.5
Tatum clay loam, 6 to 15 percent slopes, severely eroded	911	.3
Tatum clay loam, 15 to 25 percent slopes, severely eroded	467	.1
Toccoa fine sandy loam	4,878	1.4
Turbeville fine sandy loam, 2 to 6 percent slopes	2,711	.8
Turbeville fine sandy loam, 6 to 15 percent slopes, eroded	2,789	.8
Urban land	4,792	1.4
Urban land-Cecil complex, sloping	205	(1)
Urban land-Cullen complex, sloping	272	(1)
Urban land-Madison complex, sloping	1,022	.3
Vance fine sandy loam, 2 to 6 percent slopes	588	.2
Vance fine sandy loam, 2 to 6 percent slopes, eroded	701	.2
Vance fine sandy loam, 6 to 10 percent slopes, eroded	689	.2
Wahee and Augusta loams	728	.2
Wehadkee loam	971	.3
White Store fine sandy loam, 0 to 2 percent slopes	328	(1)
White Store fine sandy loam, 2 to 6 percent slopes	509	.1
White Store loam, 0 to 2 percent slopes	394	.1
White Store loam, 2 to 6 percent slopes	534	.2
White Store loam, wet variant, 0 to 2 percent slopes	385	.1
White Store loam, wet variant, 2 to 6 percent slopes	326	(1)
Wilkes loam, 2 to 6 percent slopes	218	(1)
Wilkes loam, 6 to 15 percent slopes	3,448	1.0
Wilkes loam, 15 to 25 percent slopes	8,359	2.3
Wilkes loam, 25 to 60 percent slopes	5,261	1.5
Wilkes soils, 15 to 25 percent slopes, severely eroded	817	.2
Worsham soils, 0 to 4 percent slopes	5,871	1.7
Water	1,512	.4
Total	354,560	100.0

[1] Less than 0.05 percent.

Abell Series

The Abell series consists of deep, moderately well drained to well drained, nearly level to gently sloping soils that have a loamy subsoil. These soils are at the base of slopes, at the heads of drainageways, and along small drainageways. They formed in alluvium washed from higher lying adjacent soils.

In a representative profile the surface layer is brown fine sandy loam 8 inches thick. The subsoil is 52 inches thick. The upper 13 inches is strong-brown or yellowish-red, friable sandy clay loam; the next 9 inches is yellowish-red, friable clay loam; the next 12 inches is yellowish-red, friable loam mottled with yellowish brown and grayish brown; and the lower 18 inches is mottled yellowish-brown, gray, red, grayish-brown, and yellowish-red, friable gravelly loam.

Unless limed, Abell soils are strongly acid to very strongly acid. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium. The seasonal high water table is at a depth of 2½ to 3½ feet during wet periods.

Representative profile of Abell fine sandy loam, 0 to 4 percent slopes, one-quarter mile northwest of Sherwill:

Ap1—0 to 5 inches, brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; few fine flakes of mica; few subrounded quartz pebbles; slightly acid; abrupt, smooth boundary.

Ap2—5 to 8 inches, brown (7.5YR 5/4) heavy fine sandy loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; few fine flakes of mica; few subrounded quartz pebbles; medium acid; clear, smooth boundary.

B1t—8 to 12 inches, strong-brown (7.5YR 5/6) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few thin clay films; few fine flakes of mica; few subrounded quartz pebbles; medium acid; gradual, smooth boundary.

B21t—12 to 21 inches, yellowish-red (5YR 4/8) heavy sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few thin clay films; few fine flakes of mica; few subrounded quartz pebbles; medium acid; gradual, smooth boundary.

B22t—21 to 30 inches, yellowish-red (5YR 4/8) light clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few thin clay films; few fine flakes of mica; few subrounded quartz pebbles; strongly acid; gradual, smooth boundary.

B23t—30 to 42 inches, yellowish-red (5YR 4/8) heavy loam; few, fine, faint, yellowish-brown (10YR 5/6) mottles and few, fine, distinct, grayish-brown (10YR 5/2) mottles; weak, very fine and fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common thin clay films; few fine flakes of mica; few subrounded quartz pebbles; very strongly acid; clear, wavy boundary.

IIB24t—42 to 54 inches, mottled yellowish-brown (10YR 5/6), red (2.5YR 4/8), grayish-brown (10YR 5/2), and yellowish-red (5YR 5/8) gravelly heavy loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few thin clay films; few fine flakes of mica; very strongly acid; gradual, smooth boundary.

IIB25t—54 to 60 inches, mottled gray (10YR 6/1), yellowish-brown (10YR 5/6), red (2.5YR 5/8), and strong-brown (7.5YR 5/6) gravelly heavy loam; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few thin clay films; few fine flakes of mica; strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. Depth to the IIBt horizon ranges from 36 to 48 inches. In many places subrounded quartz pebbles as much as 2 inches in diameter make up 3 to 10 percent of the solum above the IIBt horizon and 10 to 25 percent of the solum below the IIBt horizon. Depth to bedrock is more than 5 feet. The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. It ranges from fine sandy loam to loam. The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. Mottles of chroma 2 or less are within the upper 24 inches of the Bt horizon, and mottling commonly increases with increasing depth. The Bt horizon ranges from sandy clay loam and clay loam to heavy loam. The IIBt horizon is commonly mottled in yellowish brown, gray, red, strong brown, and yellowish red. It ranges from heavy loam and gravelly loam to gravelly clay loam and clay loam.

Abell soils are similar to Dogue and State soils. They have a less clayey Bt horizon than Dogue soils. They differ from State soils in having mottles of chroma 2 or less in the upper 24 inches of the Bt horizon.

Abell soils are near Appling, Cecil, Nason, Tatum, and Worsham soils. They are less well drained than Appling, Cecil, Nason, and Tatum soils, and have less clay in the B horizon than those soils. They also have less clay in the B horizon than Worsham soils and are not so gray throughout the solum.

AbB—Abell fine sandy loam, 0 to 4 percent slopes. This soil is at the base of slopes, at the heads of drainageways, and along small drainageways throughout the survey area. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Masada and Worsham soils and spots where the subsoil is thin and is fine sandy loam or loam. Also included were small areas of an Abell soil that has as much as 10 inches of overwash on the surface.

Runoff is slow. The soil receives seepage from higher lying areas and has a seasonal high water table at a depth of 2½ to 3½ feet. In places artificial drainage is beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, pasture, and tobacco. If adequately drained, limed, and fertilized it is suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIw–2; woodland group 2o1.

AeB—Abell loam, 0 to 4 percent slopes. This soil is at the base of slopes, at the heads of drainageways, and along small drainageways throughout the survey area. The surface layer is loam and the subsoil is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Masada and Worsham soils and spots where the subsoil is thin and is loam. Also included

were small areas of an Abell soil that has as much as 10 inches of overwash on the surface.

Runoff is slow. The soil receives seepage from higher lying areas and has a seasonal high water table at a depth of 2½ to 3½ feet. In places artificial drainage is beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, pasture, and tobacco. If adequately drained, limed, and fertilized, it is suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIw–2; woodland group 2o1.

Appling Series

The Appling series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from granite gneiss, quartz-mica schist, quartzite, and granite.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies an 8-inch surface layer of fine sandy loam. The upper 3 inches is grayish brown, and the lower 5 inches is light yellowish brown. The subsoil is 34 inches thick. The upper 21 inches is mostly yellowish-red, firm clay mottled with brownish yellow and red in the lower part; the lower 13 inches is yellowish-red, friable clay loam. The substratum to a depth of 60 inches is red, yellowish-brown, and very pale brown, strongly weathered quartzite that crushes easily to loam.

Unless limed, Appling soils have a very strongly acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Appling fine sandy loam, 2 to 6 percent slopes, in a mixed stand of pine and hardwoods, one-third mile south of junction of State Routes 761 and 635, south of Gladys:

O1—2 inches to 0, undecomposed and partly decomposed leaves and twigs.

A1—0 to 3 inches, grayish-brown (2.5YR 5/2) fine sandy loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; few angular quartz pebbles; very strongly acid; clear, smooth boundary.

A2—3 to 8 inches, light yellowish-brown (10YR 6/4) fine sandy loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; few angular quartz pebbles; strongly acid; clear, smooth boundary.

B1t—8 to 11 inches, strong-brown (7.5YR 5/6) clay loam; weak, fine, subangular blocky structure; friable, sticky and slightly plastic; common fine roots; few medium and coarse roots; few thin clay films; few angular quartz pebbles; very strongly acid; clear, smooth boundary.

B21t—11 to 21 inches, yellowish-red (5YR 5/6) clay; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine, medium, and coarse roots; common thin clay films; very strongly acid; gradual, smooth boundary.

B22t—21 to 29 inches, yellowish-red (5YR 4/8) clay; few fine, distinct, brownish-yellow (10YR 6/6) mottles and common medium, distinct, red (2.5YR 4/8) mottles; moderate, fine, angular blocky structure; firm, sticky and plastic; moderately thick, continuous clay films; small pockets of highly weathered quartzite; few fine flakes of mica; very strongly acid; gradual, wavy boundary.

B3t—29 to 42 inches, yellowish-red (5YR 4/8) heavy clay loam; moderate, fine, angular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; moderately thick, continuous clay films; few fine flakes of mica; strongly weathered reddish and yellowish quartzite comprises 40 percent of horizon and increases with depth; very strongly acid; gradual, wavy boundary.

C—42 to 60 inches, strongly weathered, red (2.5YR 4/8), yellowish-brown (10YR 5/6), and very pale brown (10YR 7/4) quartzite that crushes easily to friable loam; common fine flakes of mica; few fine roots; few thin, yellowish-red clay flows; very strongly acid.

The solum is 40 to 60 inches thick. In many places it is 1 to about 25 percent fine to medium, angular quartz pebbles. Depth to bedrock is generally more than 5 feet. The A horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 to 6. The Ap horizon is commonly light yellowish brown or yellowish brown. The A horizon is commonly gravelly sandy loam, sandy loam, or fine sandy loam, but ranges to sandy clay loam where the soil is severely eroded. The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. In many places it has mottles of high chroma. It is commonly clay or heavy clay loam. The C horizon ranges from gravelly sandy loam and gravelly loam to sandy loam, loam, and clay loam.

Appling soils are similar to Herndon, Masada, Mayodan, Nason, and Vance soils. They contain less silt and very fine sand than Herndon and Nason soils. They have a thinner solum than Masada soils and are not so sticky in the Bt horizon. They have less exchangeable aluminum in the Bt horizon than Mayodan soils and lack the very fine consistence in the Bt horizon that is typical of Vance soils.

Appling soils are near Abell, Cecil, Louisburg, Vance, and Worsham soils. They have more clay in the B horizon and are better drained than Abell soils. They are not so red in the B horizon as Cecil soils. They have more clay in the B horizon and a thicker solum than Louisburg soils. They are not so poorly drained as Worsham soils and are not so gray throughout the solum.

AgB—Appling gravelly sandy loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. The surface layer and subsoil are 15 to 25 percent fine to medium, angular quartz pebbles, but the profile is otherwise similar to the one described as representative of the series. Where moderately eroded, however, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Abell, Louisburg, and Vance soils.

Runoff is medium. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled. The surface layer is pebbly enough to damage and dull plowshares.

This soil is used for corn, small grain, mixed hay, and pasture. It is especially suited to bright tobacco. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

AgC—Appling gravelly sandy loam, 6 to 15 percent slopes. This soil is on narrow, winding, convex ridgetops and complex side slopes. The surface layer and subsoil are 15 to 25 percent fine to medium, angular

quartz pebbles, but the profile is otherwise similar to the one described as representative of the series. Where moderately eroded, however, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Louisburg and Vance soils.

Runoff is medium to rapid. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is pebbly enough to damage and dull plowshares.

This soil is used for corn, small grain, mixed hay, and pasture. It is especially suited to bright tobacco. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

ApB—Appling fine sandy loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the series, but where moderately eroded, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Abell, Louisburg, Masada, Nason, and Vance soils.

Runoff is medium. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

The soil is used for corn, small grain, mixed hay, pasture, and tobacco. It is especially suited to bright tobacco. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

ApC2—Appling fine sandy loam, 6 to 15 percent slopes, eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. The surface layer is 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series. Where severely eroded, the surface layer is sandy clay loam.

Included with this soil in mapping were scattered small areas of Abell, Louisburg, Masada, Nason, and Vance soils.

Runoff is medium to rapid. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and tobacco. It is especially suited to bright tobacco. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

AwE2—Appling-Wedowee gravelly sandy loams, 15 to 25 percent slopes, eroded. This mapping unit is on short, convex side slopes along drainageways. It is about 45 percent Appling soil, 35 percent Wedowee soil, and 20 percent other soils. The surface layer and subsoil of these soils are 15 to 25 percent fine to medium, angular quartz pebbles, but the profiles are otherwise similar to the ones described as representative of their respective series.

Included with these soils in mapping were scattered small areas of Louisburg soil.

Runoff is rapid, and the soils are somewhat droughty during the growing season. Further erosion is a very severe hazard in disturbed and exposed or clean-tilled areas. The surface layer is pebbly enough to damage and dull plowshares.

This mapping unit is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

AxE2—Appling-Wedowee fine sandy loams, 15 to 25 percent slopes, eroded. This mapping unit is on short convex side slopes along drainageways. It is about 40 percent Appling soil, 35 percent Wedowee soil, and 25 percent other soils. The surface layer is 2 to 6 inches thick and in places is sandy clay loam, but the profiles are otherwise similar to the ones described as representative of their respective series.

Included with these soils in mapping were scattered small areas of Louisburg and Nason soils. Also included were spots where deep gullies have formed.

Runoff is rapid, and the soils are somewhat droughty during the growing season. Further erosion is a very severe hazard in disturbed and exposed or clean-tilled areas.

This mapping unit is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

Augusta Series

The Augusta series consists of deep, somewhat poorly drained, nearly level soils that have a loamy subsoil. These soils formed in alluvium on low terraces along streams throughout the survey area.

In a representative profile the surface layer is dark-brown loam 8 inches thick. The subsoil is 33 inches thick. The upper 4 inches is light yellowish-brown, friable light clay loam mottled with red and brown; the next 14 inches is friable to firm, light brownish-gray clay loam mottled with light olive brown, yellowish brown, and yellowish red; the next 8 inches is mottled light-gray and yellowish-brown, firm clay loam; and the lower 7 inches is mottled light brownish-gray and yellowish-brown, friable very gravelly loam. The substratum to a depth of 60 inches is alluvium that is mainly gravel and cobbles.

Unless limed, Augusta soils are medium acid to strongly acid. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium. The seasonal high water table is at a depth of 1 foot to 1½ feet, and the soils are frequently flooded.

Augusta soils in this survey area were mapped only with Wahee soils.

Representative profile of Augusta loam, in an area of Wahee and Augusta loams, about one-quarter mile north of the crossing of Norfolk and Western Railroad over Dutchman Branch, west of Concord:

Ap—0 to 8 inches, dark-brown (10YR 4/3) loam; moderate, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; common fine flakes of mica; few subrounded quartz pebbles; medium acid; abrupt, smooth boundary.

B1t—8 to 12 inches, light yellowish-brown (10YR 6/4) light clay loam; common, medium, prominent, red (2.5YR 4/8) mottles and few, medium, faint, brown (10YR 5/3) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; common fine flakes of mica; few subrounded quartz pebbles; medium acid; clear, smooth boundary.

B21tg—12 to 16 inches, light brownish-gray (2.5Y 6/2) light clay loam; common, medium, distinct, light olive-brown (2.5Y 5/4) and yellowish-brown (10YR 5/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; common fine flakes of mica; few subrounded quartz pebbles; medium acid; gradual, smooth boundary.

B22tg—16 to 26 inches, light brownish-gray (2.5Y 6/2) clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, fine, distinct, yellowish-red (5YR 4/8) mottles; weak, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few thin clay films; common fine flakes of mica; few subrounded quartz pebbles; strongly acid; gradual, smooth boundary.

B23tg—26 to 34 inches, mottled light-gray (10YR 6/1) and yellowish-brown (10YR 5/8) clay loam; weak, medium, subangular blocky structure; firm, sticky and slightly plastic; few fine roots; few thin clay films; common fine flakes of mica; few subrounded quartz pebbles; strongly acid; gradual, wavy boundary.

B3tg—34 to 41 inches, mottled light brownish-gray (2.5Y 6/2) and yellowish-brown (10YR 5/6) very gravelly heavy loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine flakes of mica; medium acid; gradual, irregular boundary.

C—41 to 60 inches, multicolored massive alluvium composed of pebbles and cobbles of quartz, greenstone, and phyllite; few clay flows; medium acid.

The solum is 40 to 60 inches thick. Fine to medium subrounded quartz pebbles make up 1 to 10 percent of the A and B2t horizons and as much as 50 percent of the B3t horizon. In many places fine to coarse pebbles and cobbles make up 50 to 75 percent of the C horizon. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The B1t horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. Red, yellowish-red, and brown mottles are common. The B2t horizon is commonly light brownish gray or light gray and has high-chroma mottles, or it is mottled in light brownish gray, light gray, and yellowish red. The B2t horizon is commonly light clay loam or clay loam, but ranges to sandy clay loam. The B3t horizon is commonly light gray or gray, or is mottled in light brownish gray and yellowish brown.

Augusta soils are similar to Chewacla and Wahee soils. They have a Bt horizon, which Chewacla soils lack. They have less clay in the Bt horizon than Wahee soils.

Augusta soils are near Chewacla, Roanoke, Wahee, and Riverview soils. They have less clay in the Bt horizon than Roanoke soils and are less gray throughout the solum. They are less well drained than Riverview soils and have a Bt horizon, which those soils lack.

Bremo Series

The Bremo series consists of moderately deep, somewhat excessively drained, sloping to steep soils that have a loamy subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diabase.

In a representative profile the surface layer is dark grayish-brown loam 6 inches thick. The subsoil is olive-brown, friable channery loam 6 inches thick. The substratum, to a depth of 30 inches, is weathered greenstone that crushes easily to loam. Hard greenstone is at a depth of 30 inches.

Bremo soils are medium acid to slightly acid. They have a low content of organic matter and low natural fertility. Permeability is moderately rapid to moderate, and the available water capacity is low.

Representative profile of Bremo loam, 6 to 15 percent slopes, in a stand of small pines, two-thirds of a mile southwest of the crossing of State Route 669 over Opossum Creek, southeast of Lynchburg:

Ap—0 to 6 inches, dark grayish-brown (2.5Y 4/2) loam; moderate, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; few small weathered greenstone fragments; medium acid; abrupt, smooth boundary.

B—6 to 12 inches, olive-brown (2.5Y 4/4) channery loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few medium and coarse roots; 40 percent weathered greenstone fragments; slightly acid; gradual, irregular boundary.

C—12 to 30 inches, weathered greenstone that crushes easily to loam; few fine roots; about 35 percent hard greenstone fragments as much as 12 inches long; slightly acid; gradual, irregular boundary.

R—30 inches, greenstone.

The solum is 12 to 20 inches thick. Weathered fragments of greenstone, hornblende gneiss, or diabase make up about 10 to 40 percent of the solum and 35 to 60 percent of the C horizon. Depth to bedrock ranges from 20 to 40 inches. The A horizon has hue of 2.5Y or 10YR, value of 3 to 5, and chroma of 2 to 4. The B horizon has hue of 2.5Y or 10YR, value of 3 to 5, and chroma of 4 to 8. It ranges from channery loam to loam and gravelly loam and in places is light clay loam.

Bremo soils in this survey area are slightly acid to neutral throughout and are therefore less acid than is described as the range for the series. This difference, however, does not alter their use or management.

Bremo soils are similar to Wilkes soils. They lack the thin Bt horizon of Wilkes soils.

Bremo soils are near Cullen, Enon, Iredell, and Mecklenburg soils. They lack the Bt horizon of those soils and have a thinner solum.

BrD—Bremo loam, 6 to 15 percent slopes. This soil is on narrow, winding, convex ridgetops and on complex side slopes. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Enon, Mecklenburg, Gwinnett, and Wilkes soils. Also included were spots where the soil is less than 20 inches deep over bedrock and small areas where the slope is less than 6 percent.

Runoff is medium to rapid on this Bremo soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is clean tilled or exposed.

This soil is poorly suited to cultivated crops because of the droughtiness during the growing season and the very severe erosion hazard. It is better suited to

mixed hay, pasture, and woodland. Capability unit IVe–2; woodland group 3d1.

BrE—Bremo loam, 15 to 25 percent slopes. This soil is on short, convex side slopes along drainageways.

Included with this soil in mapping were scattered small areas of Cullen, Mecklenburg, and Wilkes soils. Also included were small gullies and small areas where the soil is less than 20 inches deep over bedrock.

Runoff is rapid on this Bremo soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is suited to pasture and woodland. Capability unit VIe–2; woodland group 3d2.

BrF—Bremo loam, 25 to 60 percent slopes. This soil is on short, convex side slopes along drainageways.

Included with this soil in mapping were scattered small areas of Wilkes soil. Also included were spots of Rock outcrop and scattered small areas where the soil is less than 20 inches deep over bedrock.

Runoff is rapid on this Bremo soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is suited to woodland. Capability unit VIIe–1; woodland group 3d2.

Brockroad Series

The Brockroad series consists of deep, well-drained, gently sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in colluvial material and the underlying material weathered from schist.

In a representative profile the surface layer is brown loam 10 inches thick. The subsoil is 74 inches thick. The upper 20 inches is strong-brown, friable to firm silty clay and clay; the next 30 inches is red, firm clay; and the lower 24 inches is red, firm silty clay loam. The substratum to a depth of 102 inches is yellowish-red, yellow, strong-brown, pink, and dark-red light silty clay loam and silt loam.

Unless limed, Brockroad soils are medium acid to very strongly acid. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Brockroad soils in this survey area were mapped only with Georgeville soils.

Representative profile of Brockroad loam, in an area of Georgeville-Brockroad loams, 2 to 6 percent slopes, 600 feet west of State Route 646 and three-quarters of a mile north of the junction of State Routes 646 and 615:

Ap—0 to 10 inches, brown (10YR 5/3) loam; weak, fine, granular structure; friable, slightly sticky and slightly plastic; common fine roots; common fine and medium pores; few subrounded quartzite pebbles; slightly acid; abrupt, smooth boundary.

B21t—10 to 17 inches, strong-brown (7.5YR 5/6) silty clay; weak, fine, subangular blocky structure; friable to firm, sticky and slightly plastic; few fine roots; common fine and medium pores; few thin clay films; few subrounded quartzite pebbles; very strongly acid; clear, smooth boundary.

B22t—17 to 30 inches, strong-brown (7.5YR 5/6) clay; common, medium, distinct, red (2.5YR 4/8) mottles and few, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few fine and medium pores; many thin clay films; few subrounded quartzite pebbles; strongly acid; gradual, wavy boundary.

IIB23t—30 to 47 inches, red (2.5YR 4/8) clay; moderate, fine, angular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few fine pores; many thin clay films; few strongly weathered schist fragments; 10 percent angular quartzite fragments; strongly acid; gradual, wavy boundary.

IIB24t—47 to 60 inches, red (2.5YR 4/6) clay; common, fine and medium, distinct, reddish-yellow (5YR 6/6) mottles or streaks of very strongly weathered schist; moderate, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few fine pores; many thin clay films; few quartzite fragments; medium acid; gradual, smooth boundary.

IIB31t—60 to 74 inches, red (2.5YR 4/6) silty clay loam; common, medium, distinct, strong-brown (7.5YR 5/8) mottles and streaks of very strongly weathered schist; weak, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine pores; few thin clay films; medium acid; gradual, smooth boundary.

IIB32t—74 to 84 inches, red (2.5YR 4/6) light silty clay loam; common, medium, distinct, reddish-yellow streaks and mottles of (5YR 6/6) very strongly weathered schist; weak, medium, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine pores; few thin clay films; strongly acid; gradual, wavy boundary.

IIC1—84 to 90 inches, yellowish-red (5YR 5/6), yellow (10YR 7/8), and strong-brown (7.5YR 5/6) light silty clay loam; massive; friable, slightly sticky and slightly plastic; few fine pores; common red clay flows; strongly acid; gradual, wavy boundary.

IIC2—90 to 102 inches, yellowish-red (5YR 5/6), pink (5YR 7/3), and dark-red (2.5YR 3/6) silt loam; massive; very friable, slightly sticky and slightly plastic; strongly acid.

The solum is 45 to 90 inches thick. Depth to the IIBt horizon ranges from 24 to 48 inches. Subrounded ferruginous quartzite pebbles make up 3 to 15 percent of the solum above the IIBt horizon. In places a thin stone line is in the upper part of the IIBt horizon. In many places very strongly weathered schist fragments are in the lower part of the IIBt horizon. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. The Bt horizon has hue of 7.5YR, 5YR, or 10YR; value of 4 or 5; and chroma of 6 to 8. The IIBt horizon has hue of 2.5YR, 5YR, or 7.5YR; value of 4 or 5; and chroma of 6 to 8. High-chroma mottles in shades of red, yellow, and brown are common in part because of the very strongly weathered schist fragments. The Bt and IIBt horizons are commonly clay, but range to silty clay and heavy silty clay loam.

Brockroad soils are similar to Cecil, Georgeville, Masada, Tatum, and Turbeville soils. They have a IIBt horizon, which those soils lack.

Brockroad soils are near Georgeville, Herndon, Nason, and Tatum soils, all of which have a thinner solum than Brockroad soils and have no IIBt horizon.

Buncombe Series

The Buncombe series consists of deep, excessively drained, nearly level to gently sloping soils that have a dominantly sandy substratum. These soils formed in

alluvium on flood plains along the larger streams in the survey area.

In a representative profile the surface layer is dark yellowish-brown loamy fine sand 8 inches thick. The substratum extends to a depth of 72 inches or more. The upper 34 inches is dark yellowish-brown, loose loamy fine sand; the next 5 inches is dark yellowish-brown, very friable fine sandy loam; and the lower 25 inches is dark yellowish-brown, loose loamy fine sand.

Unless limed, Buncombe soils are strongly acid to medium acid. They have a low content of organic matter and low natural fertility. The substratum is rapidly permeable, and the available water capacity is low. The seasonal high water table is at a depth of about 4 to 5 feet, and the soils are frequently flooded.

Representative profile of Buncombe loamy fine sand, three-quarters of a mile south of Long Island, near State Route 761:

Ap—0 to 8 inches, dark yellowish-brown (10YR 4/4) loamy fine sand; weak, fine, granular structure; very friable; common fine roots; few fine flakes of mica; medium acid; abrupt, smooth boundary.

C1—8 to 20 inches, dark yellowish-brown (10YR 4/4) loamy fine sand; common fine, distinct, pale-brown (10YR 6/3) mottles; single grained; loose; few fine roots; few fine flakes of mica; slightly acid; clear, wavy boundary.

C2—20 to 42 inches, dark yellowish-brown (10YR 4/4) loamy fine sand; single grained; loose; few fine flakes of mica; slightly acid; clear, wavy boundary.

IIC3b—42 to 47 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; common fine, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; very friable; few fine flakes of mica; medium acid; clear, smooth boundary.

IIC4—47 to 72 inches, dark yellowish-brown (10YR 4/4) loamy fine sand; single grained; loose; few fine flakes of mica; medium acid; clear, smooth boundary.

Depth to bedrock is more than 5 feet. In places the IIC horizon contains layers of gravel. The A horizon has hue of 10YR or 2.5Y, value of 4 to 5, and chroma of 2 to 4. The C horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 3 to 6; and chroma of 2 to 6. Texture throughout the profile is commonly loamy fine sand, but ranges to gravelly and very gravelly loamy sand. In places the C horizon is thinly stratified with fine sandy loam or loam.

Buncombe soils are similar to Chewacla, Riverview, and Toccoa soils. They are more excessively drained than any of those soils and have more sand and less silt and clay throughout the solum.

Buncombe soils are near Chewacla, Riverview, State, Toccoa, and Wehadkee soils. They lack the Bt horizon typical of State soils and are not so gray and poorly drained as Wehadkee soils.

Bu—Buncombe loamy fine sand. This soil is on flood plains along the larger streams and is generally close to the stream channel. Slopes are dominantly 0 to 4 percent.

Included with this soil in mapping were scattered small areas of Chewacla and Toccoa soils. Also included were small areas on natural levees where the slope is more than 4 percent.

Runoff is slow. The soil is frequently flooded by nearby streams. It is droughty.

This soil is used for cultivated crops, pasture, and woodland. If protected from flooding and adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIs–1; woodland group 2s1.

Cecil Series

The Cecil series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from granite gneiss, quartz schist, and quartzite.

In a representative profile about 1 inch of partly decomposed forest litter overlies a 5-inch surface layer of yellowish-brown fine sandy loam. The subsoil is 39 inches thick. The upper 4 inches is reddish-brown, friable clay loam; the next 26 inches is red, firm clay; and the lower 9 inches is red, friable clay loam mottled with reddish brown and reddish yellow. The substratum to a depth of 86 inches is red, reddish-yellow, and white weathered gneiss that crushes easily to loam.

Unless limed, Cecil soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Cecil fine sandy loam, 2 to 6 percent slopes, eroded, in woodland, one-half mile east of intersection of State Routes 699 and 712, north of Altavista:

O1—1 inch to 0, partly decomposed leaves, twigs, and roots.

Ap—0 to 5 inches, yellowish-brown (10YR 5/4) fine sandy loam, weak, fine, granular structure; very friable; few fine roots; common angular quartz pebbles; medium acid; abrupt, smooth boundary.

B1t—5 to 9 inches, reddish-brown (5YR 5/4) heavy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; strongly acid; clear, smooth boundary.

B2t—9 to 35 inches, red (2.5YR 4/6) clay; moderate, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; many thin clay films; strongly acid; gradual, wavy boundary.

B3t—35 to 44 inches, red (2.5YR 4/8) clay loam; few, fine, distinct, reddish-brown (2.5YR 4/4) and reddish-yellow (5YR 6/8) mottles; weak, medium, angular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common thin clay films; common weathered gneiss fragments; very strongly acid; abrupt, wavy boundary.

C—44 to 86 inches, red (2.5YR 4/6), reddish-yellow (7.5YR 6/6), and white (N 8/0) weathered gneiss that crushes easily to loam; massive; friable; thin clay flows in upper part; very strongly acid.

The solum is 40 to 60 inches thick. It is less than 1 to about 10 percent angular quartz pebbles. In places it is about 15 to 50 percent angular quartz cobbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. It is commonly fine sandy loam, but ranges to sandy loam and cobbly fine sandy loam and, where the soil is severely eroded, to clay loam. The Bt horizon has hue of 2.5YR and in places 10R, value of 4 to 5, and chroma of 4 to 8. It is commonly clay or heavy clay loam. The C horizon ranges from loam to clay loam.

Cecil soils are similar to Cullen, Madison, and Turbeville soils. They have a thicker solum and less mica than Madi-

son soils. They have a thinner solum than Turbeville soils. Clay minerals in Cecil soils are predominantly kaolinitic, whereas in Cullen and Turbeville soils they are mixed.

Cecil soils are near Abell, Appling, Louisburg, Madison, and Masada soils. They are better drained than Abell soils and lack mottles of chroma 2 in the lower part of the B horizon. They have a redder B horizon than Appling soils. They have a thicker solum than Louisburg soils and have more clay in the B horizon. They have a thinner solum than Masada soils and also differ from those soils in clay mineralogy.

CcB2—Cecil fine sandy loam, 2 to 6 percent slopes, eroded. This soil is on broad, convex ridgetops. It has the profile described as representative of the series, but where slightly eroded, the surface layer is 6 to 10 inches thick.

Included with this soil in mapping were scattered small areas of Cullen, Louisburg, Madison, and Tatum soils.

Runoff is medium on this Cecil soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, soybeans, tobacco, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

CcC2—Cecil fine sandy loam, 6 to 15 percent slopes, eroded. This soil is on narrow, winding convex ridgetops and on complex side slopes. In some slightly eroded areas the surface layer is 6 to 10 inches thick and in severely eroded areas it is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Madison, and Tatum soils.

Runoff is medium to rapid on this Cecil soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, tobacco, small grain, mixed hay, and pasture. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–1; woodland group 3o1.

CcE2—Cecil fine sandy loam, 15 to 25 percent slopes, eroded. This soil is on short, convex side slopes along drainageways. In slightly eroded areas the surface layer is 6 to 8 inches thick and in severely eroded areas it is clay loam, but the profile is otherwise similar to the one dsecribed as representative of the series.

Included with this soil in mapping were scattered small areas of Louisburg and Tatum soils.

Runoff is rapid on this Cecil soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is commonly used as pasture and woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

CdC—Cecil cobbly fine sandy loam, 6 to 15 percent slopes. This soil is on narrow, convex ridgetops and on broad side slopes. The surface layer and subsoil are 15 to 50 percent cobbles, and in many areas the surface layer is 6 to 10 inches thick. The profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Georgeville, Louisburg, and Madison soils.

Runoff is medium to rapid on this Cecil soil, and the soil is somewhat droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is cobbly enough to damage and dull plowshares.

This soil is commonly used as woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the very severe erosion hazard, and the cobbly surface layer. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–5; woodland group 3o1.

CeB3—Cecil clay loam, 2 to 6 percent slopes, severely eroded. This soil is on broad, convex ridgetops. The surface layer is mostly subsoil material, but the profile is otherwise similar to the one described as representative of the series. Where less severely eroded, the surface layer is fine sandy loam.

Included with this soil in mapping were scattered small areas of Cullen, Georgeville, Madison, and Tatum soils. Also included were small gullies.

Runoff is medium on this Cecil soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is sticky when wet and hard when dry. If worked when too wet, the soil becomes puddled and plowshares do not scour. If worked when too dry, the soil breaks up in clods that are difficult to work down into a seedbed.

This soil is used for corn, small grain, mixed hay, pasture, and tobacco. It is better suited to burley tobacco than to bright tobacco. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–3; woodland group 4c1.

CeD3—Cecil clay loam, 6 to 15 percent slopes, severely eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. The surface layer is mostly subsoil material, but the profile is otherwise smiliar to the one described as representative of the series. Where less severely eroded, the surface layer is fine sandy loam.

Included with this soil in mapping were scattered small areas of Cullen, Georgeville, Madison, and Tatum soils. Also included were small gullies.

Runoff is medium to rapid on this Cecil soil. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is sticky when wet and hard when dry. If worked when too wet, the soil becomes puddled and plowshares do not scour. If worked when too dry, the soil breaks up in clods that are difficult to work down into a seedbed.

This soil is commonly used for small grain, mixed hay, and pasture. It is poorly suited to cultivated crops because of the very severe erosion hazard, the slope, and the clay loam surface layer. It is better

suited to mixed hay, pasture, and woodland. Capability unit IVe–3; woodland group 4c1.

CeE3—Cecil clay loam, 15 to 25 percent slopes, severely eroded. This soil is on short, convex side slopes along drainageways. The surface layer is mostly subsoil material, but the profile is otherwise similar to the one described as representative of the series. Where less severely eroded, the surface layer is fine sandy loam.

Included with this soil in mapping were scattered small areas of Cullen, Georgeville, Louisburg, Tallapoosa, Tatum, and Wilkes soils. Also included were small gullies.

Runoff is rapid on this Cecil soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is commonly used as woodland. It is suited to pasture and woodland. Capability unit VIe–1; woodland group 4c2.

Chewacla Series

The Chewacla series consists of deep, somewhat poorly drained, nearly level soils that have a loamy subsoil. These soils formed in alluvium on flood plains along the streams of the survey area.

In a representative profile the surface layer is brown loam 8 inches thick. The subsoil is 30 inches thick. The upper 10 inches is brown, friable loam and light silty clay loam mottled with yellowish red in the lower part; the lower 20 inches is mottled light-gray, strong-brown, and yellowish-red, friable light silty clay loam. The substratum to a depth of 68 inches is dark grayish-brown, very friable silt loam mottled with dark yellowish brown and yellowish red.

Unless limed, Chewacla soils are strongly acid. They have a medium content of organic matter and medium natural fertility. The subsoil is moderately permeable, and the available water capacity is high. The seasonal high water table is at a depth of 1 foot to 1½ feet, and the soils are frequently flooded.

Representative profile of Chewacla loam, 130 feet west of junction of U.S. Highway 501 and State Route 898, north of Rustburg:

Ap—0 to 8 inches, brown (10YR 4/3) loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; common fine flakes of mica; medium acid; abrupt, smooth boundary.

B1—8 to 15 inches, brown (7.5YR 5/4) loam; weak, medium, subangular blocky structure; very friable, slightly sticky and slightly plastic; many fine roots; common fine flakes of mica; strongly acid; abrupt, smooth boundary.

B21—15 to 18 inches, brown (7.5YR 4/4) light silty clay loam; few, fine, faint, yellowish-red (5YR 4/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; common fine flakes of mica; strongly acid; gradual, wavy boundary.

B22—18 to 38 inches, mottled light-gray (10YR 6/1), strong-brown (7.5YR 5/6), and yellowish-red (5YR 5/6) light silty clay loam; weak, medium, subangular blocky structure; very friable, slightly sticky and slightly plastic; many fine roots; common fine flakes of mica; few soft black concretions; strongly acid; gradual, wavy boundary.

Cg—38 to 68 inches, dark grayish-brown (10YR 4/2) silt loam; common, fine, distinct, dark yellowish-brown (10YR 3/4) and yellowish-red (5YR 4/6) mottles; massive; very friable, slightly sticky and slightly plastic; few fine and medium roots; common fine flakes of mica; strongly acid.

The solum is 36 to 48 inches thick. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. Mottles of chroma 2 or less begin at a depth of about 18 inches and increase with increasing depth. Ped surfaces are often chroma 2 or less. The B horizon is light silty clay loam or loam. The C horizon is commonly dark grayish brown, grayish brown, or gray, and has high-chroma mottles. It ranges from silt loam and loam to sandy loam and gravelly sandy loam, but in places it is sand and gravel.

Chewacla soils are similar to Augusta and Wehadkee soils. They lack the Bt horizon typical of Augusta soils. They are better drained than Wehadkee soils and are not so gray throughout the solum.

Chewacla soils are near Buncombe, Riverview, State, and Toccoa soils. They are more poorly drained than those soils.

Ch—Chewacla loam. This soil is on low-lying flood plains and along streams. It is generally away from the stream channel. It has the profile described as representative of the series. Slopes are dominantly 0 to 2 percent.

Included with this soil in mapping were scattered small areas of Augusta, Riverview, Toccoa, and Wehadkee soils.

Runoff is slow on this Chewacla soil. The soil receives seepage and runoff from adjacent, higher lying areas, is frequently flooded by nearby streams, and has a seasonal high water table at a depth of 1 foot to 1½ feet. Drainage is desirable if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately drained, protected from flooding, limed, and fertilized, it is moderately well suited to most locally grown crops. Alfalfa is commonly short lived because of excessive wetness and flooding. Capability unit IIIw–1; woodland group 1w1.

CT—Chewacla-Toccoa complex. This mapping unit is on narrow, low-lying flood plains along drainageways and streams throughout the survey area. It is about 45 percent Chewacla soils and 30 percent Toccoa soils. Slopes are dominantly 0 to 2 percent.

Included in this unit in mapping were scattered small areas of Augusta, Buncombe, Riverview, Roanoke, and Wehadkee soils.

Runoff is slow. This mapping unit often receives seepage and runoff from adjacent, higher lying areas, is frequently flooded by nearby drainageways and streams, and has a seasonal high water table at a depth of 1 foot to 4 feet. Drainage is often desirable if the soils are cultivated.

This mapping unit is used for corn, mixed hay, pasture, and woodland. If adequately drained, protected from flooding, limed, and fertilized, it is moderately well suited to most locally grown crops. Alfalfa is commonly short lived because of excessive wetness and flooding. Capability unit IIIw–1; woodland group 1w1.

Cullen Series

The Cullen series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diorite.

In a representative profile about 3 inches of partly decomposed forest litter overlies a 5-inch surface layer of reddish-brown loam. The subsoil is 48 inches thick. The upper 31 inches is dark-red, firm clay; the lower 17 inches is red, firm heavy clay loam mottled with reddish yellow. The substratum to a depth of 68 inches is yellowish-red, reddish-yellow, and black, weathered gneiss that crushes to loam and clay loam.

Unless limed, Cullen soils have a very strongly acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Cullen loam, 2 to 6 percent slopes, in a stand of mixed hardwoods, three-quarters of a mile south of junction of State Routes 615 and 646, 50 feet east of State Route 646, southeast of Mike:

O1—3 inches to ½ inch, fresh and partly decayed leaves and twigs.

O2—½ inch to 0, well-decomposed leaves and twigs.

Ap—0 to 5 inches, reddish-brown (5YR 5/4) loam; weak, fine, granular structure; friable, slightly sticky and slightly plastic; many fine and medium roots; few coarse roots; medium acid; clear, smooth boundary.

B2t—5 to 36 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; firm, sticky and plastic; common fine and medium roots and few coarse roots; common thin clay films; few fine flakes of mica; very strongly acid; clear, smooth boundary.

B3t—36 to 53 inches, red (2.5YR 4/6) heavy clay loam; few, fine, distinct, reddish-yellow (7.5YR 6/8) mottles; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; many fine flakes of mica; very strongly acid; gradual, wavy boundary.

C—53 to 68 inches, yellowish-red, reddish-yellow, and black, weathered gneiss that crushes to loam and clay loam; red clay flows in seams in upper part; massive; friable, slightly sticky and slightly plastic; many fine and medium flakes of mica, increasing with depth; very strongly acid.

The solum is 40 to 60 inches thick. In places it is less than 1 to about 10 percent angular quartz pebbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. It ranges from loam to clay loam where the soil is severely eroded. The Bt horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 6 to 8. It is commonly clay or heavy clay loam.

Cullen soils are similar to Cecil, Georgeville, Gwinnett, Hiwassee, and Madison soils. Clay minerals in Cullen soils are mixed, whereas in Cecil, Georgeville, Gwinnett, Hiwassee, and Madison soils they are kaolinitic.

Cullen soils are near Cecil, Fluvanna, Georgeville, Gwinnett, and Iredell soils. They have a redder B horizon than Fluvanna soils. They are better drained than Iredell soils and have a redder B horizon.

CuB—Cullen loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Enon, Fluvanna, and Georgeville soils.

Runoff is medium on this Cullen soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, tobacco, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

CuC2—Cullen loam, 6 to 15 percent slopes, eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. In some slightly eroded areas the surface layer is 6 to 8 inches thick and in a few severely eroded areas it is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Enon, Fluvanna, Georgeville, and Gwinnett soils.

Runoff is medium to rapid on this Cullen soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, tobacco, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–1; woodland group 3o1.

CuE2—Cullen loam, 15 to 25 percent slopes, eroded. This soil is on short, convex side slopes along drainageways. In some slightly eroded areas the surface layer is 6 to 8 inches thick and in a few severely eroded areas it is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Bremo, Georgeville, and Wilkes soils.

Runoff is rapid on this Cullen soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is commonly used as pasture and woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

CxB3—Cullen clay loam, 2 to 6 percent slopes, severely eroded. This soil is on broad, convex ridgetops. The surface layer is mostly subsoil material, but the profile is otherwise similar to the one described as representative of the series. Where less severely eroded, the surface layer is loam.

Included with this soil in mapping were scattered small areas of Georgeville, Gwinnett, and Madison soils.

Runoff is medium on this Cullen soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is sticky when wet and hard when dry. If worked when too wet, the soil becomes puddled and plowshares do not scour. If worked when too dry, the soil breaks up into clods that are difficult to work down into a seedbed.

This soil is used for corn, tobacco, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–3; woodland group 4c1.

CxC3—Cullen clay loam, 6 to 15 percent slopes, severely eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. The surface layer is mostly subsoil material, but the profile is otherwise similar to the one described as representative of the series. Where less severely eroded, the surface layer is loam.

Included with this soil in mapping were scattered small areas of Georgeville, Gwinnett, and Madison soils. Also included were small gullies.

Runoff is medium to rapid on this Cullen soil. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is stocky when wet and hard when dry. If worked when too wet, the soil becomes puddled and plowshares do not scour. If worked when too dry, the soil breaks up into clods that are difficult to work down into a seedbed.

This soil is commonly used for small grain, mixed hay, pasture, and woodland. It is poorly suited to cultivated crops because of the very severe erosion hazard, the slope, and the clay loam surface layer. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–3; woodland group 4c1.

CxE3—Cullen clay loam, 15 to 25 percent slopes, severely eroded. This soil is on short, convex side slopes along drainageways. The surface layer is mostly subsoil material, but the profile is otherwise similar to the one described as representative of the series. Where less eroded, the surface layer is loam.

Included with this soil in mapping were scattered small areas of Bremo, Georgeville, Madison, and Wilkes soils. Also included were small gullies.

Runoff is rapid on this Cullen soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is commonly used as pasture and woodland and is best suited to these uses. Capability unit VIe–1; woodland group 4c2.

Cut and Fill Land

Cut and fill land is removed or reworked soil material. Some areas have been leveled for commercial construction, parking lots, airports, and school construction, and others have been excavated, filled, and shaped for various other purposes. Some areas have been paved. The texture of the soil material varies. Cut and fill land is identified by spot symbols on soil maps.

Dogue Series

The Dogue series consists of deep, moderately well drained, nearly level to gently sloping soils that have a dominantly clayey subsoil. These soils formed in alluvium on low terraces along the larger streams of the survey area.

In a representative profile the surface layer is dark-brown fine sandy loam 8 inches thick. The subsoil is 49 inches thick. The upper 17 inches is yellowish-brown, friable heavy clay loam and clay; the next 14 inches is yellowish-brown, firm clay mottled with gray, yellowish red, and grayish brown; the next 11 inches is mottled brown, gray, strong brown, and red, firm clay; and the lower 7 inches is yellowish-brown, friable clay loam mottled with light gray. The substratum to a depth of 64 inches is mottled yellowish-brown and light-gray, very friable light sandy clay loam.

Unless limed, Dogue soils are strongly acid to very strongly acid. They have a low content of organic matter and low natural fertility. Permeability is moderately slow in the subsoil, and the available water capacity is medium. The seasonal high water table is at a depth of 2 to 3 feet, and the soils are occasionally flooded.

Representative profile of Dogue fine sandy loam, 0 to 2 percent slopes, 1½ miles southwest of end of State Route 820 and one-quarter mile east of North Fork Falling River, south of Spring Mills:

Ap—0 to 8 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; neutral; abrupt, smooth boundary.

B1t—8 to 11 inches, yellowish-brown (10YR 5/4) heavy clay loam; weak, fine, subangular blocky structure; friable, sticky and slightly plastic; few fine roots; few thin clay films; few fine rounded quartz pebbles; slightly acid; clear, smooth boundary.

B21t—11 to 25 inches, yellowish-brown (10YR 5/6) clay; moderate, fine, subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common thin clay films; few fine rounded quartz pebbles; strongly acid; gradual, wavy boundary.

B22t—25 to 39 inches, yellowish-brown (10YR 5/4) clay; few, medium, distinct, gray (10YR 6/1) and yellowish-red (5YR 4/6) mottles and few, fine, faint, grayish-brown (10YR 5/2) mottles; moderate, fine, subangular blocky structure; firm, sticky and slightly plastic; few fine roots; many thin clay films; few fine flakes of mica; few fine rounded quartz pebbles; strongly acid; gradual, irregular boundary.

B23t—39 to 50 inches, mottled brown (10YR 5/3), gray (10YR 5/1), strong-brown (7.5YR 5/8), and red (2.5YR 4/8) clay; moderate, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; common thin clay films; few flakes of mica; few fine rounded quartz pebbles; very strongly acid; gradual, wavy boundary.

B3t—50 to 57 inches, yellowish-brown (10YR 5/8) clay loam; many, coarse, distinct, light-gray (10YR 6/1) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few moderately thick clay films; few fine flakes of mica; few fine rounded quartz pebbles; very strongly acid; gradual, wavy boundary.

C—57 to 64 inches, mottled yellowish-brown (10YR 5/8) and light-gray (10YR 6/1) light sandy clay loam; massive; very friable, slightly sticky and slightly plastic; few fine flakes of mica; very strongly acid.

The solum is 40 to 60 inches thick. It is 1 to about 5 percent fine to medium, rounded quartz pebbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or

2.5Y, value of 4 or 5, and chroma of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 4 to 8. Mottles of chroma 2 or less are within the upper 24 inches of the Bt horizon, and in places this horizon has high-chroma mottles. The Bt horizon is commonly heavy clay loam or clay. The C horizon ranges from sandy clay loam to sand and gravel.

Dogue soils are similar to Augusta, Helena, and Wahee soils. They are better drained than Augusta and Wahee soils and are not so gray in the B horizon. Also, they have more clay in the B horizon than Augusta soils. They have a thicker solum than Helena soils and are not so sticky and plastic in the lower part of the B horizon.

Dogue soils are near Augusta, Masada, Roanoke, State, and Wahee soils. They are not so well drained as Masada and State soils and also differ from those soils in having gray mottles in the upper 24 inches of the Bt horizon. They are better drained than Roanoke soils and are not so gray throughout the solum.

DoA—Dogue fine sandy loam, 0 to 2 percent slopes. This soil is on small, low stream terraces and on flood plains. It is generally away from the stream channel. This soil has the profile described as representative of the series, but in places the surface layer is as much as 12 inches thick.

Included with this soil in mapping were scattered small areas of Augusta, Masada, State, and Wahee soils.

Runoff is slow on this Dogue soil. In places the soil receives seepage from higher lying areas. It has a seasonal high water table at a depth of 2 to 3 feet and is occasionally flooded in places. Artificial drainage is beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately drained, limed, and fertilized, it is suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIw–2; woodland group 2w2.

DoB—Dogue fine sandy loam, 2 to 6 percent slopes. This soil is on low stream terraces and is generally near the stream channel. In places the surface layer is as much as 12 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Augusta, Masada, State, and Wahee soils. Also included were spots where the slope is more than 6 percent.

Runoff is medium on this Dogue soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled. The soil has a seasonal high water table at a depth of 2 to 3 feet. In places artificial drainage is beneficial if the soil is cultivated. Some areas are occasionally flooded.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately drained, limed, and fertilized, it is suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIe–2; woodland group 2w2.

Elbert Series

The Elbert series consists of deep, poorly drained, nearly level to gently sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland, on broad flats, at the heads of drainageways, and in slight depressions. They formed in material weathered from greenstone, hornblende gneiss, diabase, and basic Triassic shale.

In a representative profile about 1 inch of undecomposed and partly decomposed forest litter overlies a 6-inch surface layer of loam. The upper 3 inches is dark grayish brown mottled with gray, and the lower 3 inches is dark gray mottled with strong brown. The subsoil is 47 inches thick. The upper 6 inches is gray, friable clay loam mottled with yellowish brown; the next 21 inches is gray and dark-gray, very firm clay mottled with yellowish brown and light olive brown; the next 9 inches is gray, firm sandy clay mottled with yellowish brown; and the lower 11 inches is gray, friable sandy clay loam mottled with yellowish brown. The substratum to a depth of 60 inches is strongly weathered diabase that crushes to fine sandy loam.

Elbert soils have a medium acid to mildly alkaline subsoil. They have a medium content of organic matter and medium natural fertility. The subsoil is slowly to very slowly permeable, and the water capacity is medium. The seasonal high water table is at the surface or within a depth of 1 foot during wet periods, and the soils are frequently flooded.

Representative profile of Elbert loam, in a stand of mixed hardwoods, 50 feet east of State Route 727 and one-half mile west-northwest of junction of State Routes 727 and 701, northeast of Castle Craig:

O1—1 inch to 0, undecomposed and partly decomposed leaves and twigs.

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) loam; few, medium, faint, gray (10YR 5/1) mottles; moderate, medium, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; mildly alkaline; clear, smooth boundary.

A2—3 to 6 inches, dark-gray (10YR 4/1) loam; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; mildly alkaline; clear, smooth boundary.

B1tg—6 to 12 inches, gray (10YR 5/1) clay loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, fine, subangular blocky structure; friable, sticky and plastic; few fine, medium, and coarse roots; few thin clay films; few fine black concretions; slightly acid; clear, wavy boundary.

B21tg—12 to 16 inches, gray (10YR 5/1) clay; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; few fine, medium, and coarse roots; many thin clay films; mildly alkaline; clear, irregular boundary.

B22tg—16 to 33 inches, dark-gray (N 4/0) clay; many, medium, distinct, light olive-brown (2.5Y 5/4) mottles; moderate, medium, angular blocky structure; very firm, sticky and very plastic; few fine, medium, and coarse roots; thin, continuous clay films; few fine subrounded pebbles; mildly alkaline; clear, wavy boundary.

B31tg—33 to 42 inches, gray (N 5/0) sandy clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; firm, slightly sticky and plastic; few fine roots; many moderately thick clay films; few fine sub-

rounded pebbles; mildly alkaline; gradual, wavy boundary.

B32tg—42 to 53 inches, gray (10YR 5/1) heavy sandy clay loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; few fine subrounded pebbles; thin stone line of subrounded pebbles and cobbles as much as 5 inches in diameter at a depth of 53 inches; mildly alkaline; abrupt, wavy boundary.

IIC—53 to 60 inches, strongly weathered diabase that crushes to fine sandy loam; massive; few fine flakes of mica; mildly alkaline.

The solum is 40 to 60 inches thick. A few fine, subrounded pebbles are in some places, and in other places a thin stone line of subrounded pebbles and cobbles is at the base of the Bt horizon. Depth to bedrock is commonly 4 feet or more. The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The Bt horizon has hue of 10YR, 2.5Y, 5Y, or N; value of 4 or 5; and chroma of 0 to 2. High-chroma mottles are common. The B2t horizon is commonly clay, but the B3t horizon ranges from sandy clay to heavy sandy clay loam.

Elbert soils are similar to Iredell, Roanoke, White Store, and Worsham soils. They are more poorly drained than Iredell and White Store soils and are grayer throughout the solum. They have more silt and less sand than Worsham soils and are more sticky and plastic in the B2t horizon. Clay minerals in Elbert soils are predominantly montmorillonitic, whereas in Roanoke soils they are mixed.

Elbert soils are near Bremo, Enon, Iredell, Mecklenburg, and Wilkes soils. They are more poorly drained than Bremo, Enon, Mecklenburg, and Wilkes soils and have more clay in the B horizon than Bremo and Wilkes soils.

Eb—Elbert loam. This soil is on broad upland flats, at the heads of drainageways, and in slight depressions. Slopes are dominantly 0 to 4 percent.

Included with this soil in mapping were scattered small areas of Helena, Iredell, Roanoke, and Worsham soils. Also included were spots where the slope is more than 4 percent.

Runoff is slow on this Elbert soil. The soil receives seepage from higher lying areas, has a seasonal high water table at the surface or within a depth of 1 foot, and is frequently flooded.

This soil is used mostly as pasture and woodland. It is poorly suited to cultivated crops because of excessive wetness and flooding. Capability unit Vw–1; woodland group 4w1.

Enon Series

The Enon series consists of deep, well-drained, gently sloping and sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diabase.

In a representative profile about 1 inch of fresh hardwood litter overlies a 7-inch surface layer of dark grayish-brown fine sandy loam. The subsoil is strong-brown, firm clay 21 inches thick. The substratum to a depth of 60 inches is mixed very dark gray, strong-brown, and olive-yellow loam and many weathered rock fragments.

Enon soils have a medium acid to neutral subsoil. They have a low content of organic matter and medium natural fertility. The subsoil is slowly permeable, and the available water capacity is medium.

Representative profile of Enon fine sandy loam, 2 to 6 percent slopes, in a stand of mixed hardwoods, one-half mile east and one-third mile south of junction of U.S. Highway 501 and State Route 607, southeast of Winfall:

O1—1 inch to 0, fresh hardwood litter.

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; common fine and medium roots; medium acid; abrupt, smooth boundary.

B2t—7 to 28 inches, strong-brown (7.5YR 5/6) clay; moderate, medium, angular blocky structure; firm, sticky and plastic; common fine and medium roots; many moderately thick clay films; common partly weathered rock fragments; medium acid; clear, wavy boundary.

C—28 to 60 inches, mixed very dark gray, strong-brown, and olive-yellow loam and many dark weathered rock fragments; massive; few fine roots; weathered rock fragments coated with brown clay; slightly acid.

The solum is 20 to 40 inches thick. Weathered rock fragments as much as 10 inches in diameter make up 1 to 5 percent of the solum and from 20 to 50 percent of the substratum. Depth to bedrock ranges from 3½ to 5 feet or more. The A horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 4 to 6; and chroma of 2 to 6. The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is commonly clay, but ranges to heavy clay loam. The C horizon ranges from loam to clay loam and sandy clay loam, has a varying number of rock fragments, and in places is strongly weathered rock that crushes to loam or clay loam.

Enon soils are similar to Iredell, Mecklenburg, Vance, and Wilkes soils. They are better drained than Iredell soils and are not so plastic in the Bt horizon. They are not so red throughout as Mecklenburg soils. They have more than 35 percent base saturation, whereas Vance soils have less than 35 percent. They have a thicker B horizon than Wilkes soils.

Enon soils are near Bremo, Cullen, Elbert, and Fluvanna soils. They contain more clay than Bremo soils. They are not so red as Cullen soils, have a less silty B horizon than Fluvanna soils, and are better drained than Elbert soils.

EnB—Enon fine sandy loam, 2 to 6 percent slopes. This soil is in small areas on convex ridgetops. It has the profile described as representative of the series. Where more eroded, the surface layer is clay loam.

Included with this soil in mapping were scattered small areas of Bremo, Helena, Iredell, Mecklenburg, and Wilkes soils.

Runoff is medium on this Enon soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–2; woodland group 4o2.

EnC2—Enon fine sandy loam, 6 to 10 percent slopes, eroded. This soil is in small areas on narrow, convex ridgetops and on short side slopes. The surface layer is 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series. Where more eroded, the surface layer is clay loam.

Included with this soil in mapping were scattered small areas of Bremo, Iredell, Mecklenburg, Vance, and Wilkes soils.

Runoff is medium on this Enon soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–4; woodland group 4o2.

Fluvanna Series

The Fluvanna series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diorite.

In a representative profile the surface layer is dark grayish-brown fine sandy loam 6 inches thick. The subsoil is 39 inches thick. The upper 3 inches is reddish-brown, friable clay loam; the next 19 inches is yellowish-red, firm clay mottled with yellowish brown in the lower part; the next 8 inches is mottled weak-red, yellowish-red, and light olive-brown, friable clay; and the lower 9 inches is yellowish-red, friable clay loam mottled with red, light gray, and strong brown. The substratum to a depth of 60 inches is strongly weathered, mixed weak-red, yellowish-red, and light-gray basic and acidic rock that crushes to clay loam.

Unless limed, Fluvanna soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately slowly permeable, and the available water capacity is medium.

Representative profile of Fluvanna fine sandy loam, 6 to 15 percent slopes, eroded, one-fifth mile east and one-tenth mile south of junction of U.S. Highway 501 and State Route 686, south of Rustburg:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few small dark concretions; few fine quartz pebbles; neutral; abrupt, smooth boundary.

B1—6 to 9 inches, reddish-brown (5YR 4/4) clay loam; moderate, fine, angular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few small dark concretions; neutral; clear, wavy boundary.

B21t—9 to 18 inches, yellowish-red (5YR 4/6) clay; moderate, fine, angular blocky structure; firm, sticky and plastic; common fine roots; many moderately thick clay films; very strongly acid; clear, wavy boundary.

B22t—18 to 28 inches, yellowish-red (5YR 4/6) clay; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, angular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; moderately thick, continuous clay films; very strongly acid; clear, wavy boundary.

B23t—28 to 36 inches, mottled weak-red (10R 4/4), yellowish-red (5YR 5/6), and light olive-brown (2.5Y 5/4) clay; moderate, fine, angular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; moderately thick, continuous clay films; very strongly acid; clear, wavy boundary.

B3t—36 to 45 inches, yellowish-red (5YR 5/6) clay loam; common, fine, prominent, red (2.5YR 4/8) and light-gray (N 7/0) mottles and few, fine, distinct, strong-brown (7.5YR 5/8) mottles; weak, fine, angular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; moderately thick, continuous clay films; 40 percent strongly weathered, multicolored mixed basic and acidic rock; very strongly acid; clear, wavy boundary.

C—45 to 60 inches, mixed weak-red (10R 4/4), yellowish-red (5YR 5/6), and light-gray (N 7/0), strongly weathered, mixed basic and acidic rock that crushes to clay loam; massive; gray and red clay flows in upper part; very strongly acid.

The solum is 30 to 56 inches thick. It is less than 1 percent to about 10 percent fine, angular quartz pebbles. Depth to bedrock ranges from 3½ feet to 5 feet or more. The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. High-chroma mottles are common, and in many places the B3t horizon has gray and light-gray mottles. The C horizon is commonly multicolored, mixed basic acidic rock that crushes to clay loam or loam.

Fluvanna soils are similar to Appling, Enon, Mecklenburg, and Vance soils. Clay minerals in Fluvanna soils are mixed, whereas in Appling soils they are kaolinitic. Fluvanna soils typically have a redder B horizon than Enon soils and a somewhat thicker solum. They have less than 35 percent base saturation, whereas Mecklenburg soils have more than 35 percent. They have a more silty B horizon than Vance soils.

Fluvanna soils are near Appling, Cecil, Cullen, Helena, and Wilkes soils. They are not so red throughout the solum as Cecil and Cullen soils. They are better drained than Helena soils and have more clay than Wilkes soils.

FlB2—Fluvanna fine sandy loam, 2 to 6 percent slopes, eroded. This soil is in small areas on convex ridgetops. In some slightly eroded areas the surface layer is 7 to 9 inches thick and in a few more eroded areas it is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Enon, Helena, and Wilkes soils.

Runoff is medium on this Fluvanna soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

FlC2—Fluvanna fine sandy loam, 6 to 15 percent slopes, eroded. This soil is on narrow, convex ridgetops and on short side slopes. It has the profile described as representative of the series. Where slightly eroded, however, the surface layer is as much as 9 inches thick, and where more eroded, it is clay loam.

Included with this soil in mapping were scattered small areas of Cullen, Enon, Helena, and Wilkes soils.

Runoff is medium to rapid on this Fluvanna soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–1; woodland group 3o1.

FlE2—Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded. This soil is on short, convex side slopes along drainageways. In some slightly eroded areas the

surface layer is more than 6 inches thick and in some more eroded areas it is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Mecklenburg, and Wilkes soils.

Runoff is rapid on this Fluvanna soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

Forestdale Series

The Forestdale series consists of deep, poorly drained, nearly level soils that have a dominantly clayey subsoil. These soils formed in alluvium on low terraces along the streams of the survey area.

In a representative profile the surface layer is grayish-brown silt loam 7 inches thick. The subsoil is 55 inches thick. The upper 3 inches is light-gray, friable silty clay loam mottled with yellowish brown; the next 11 inches is light brownish-gray, firm clay mottled with yellowish brown and light gray; the next 27 inches is gray, firm clay mottled with strong brown and dark yellowish brown; and the lower 14 inches is gray, firm clay mottled with yellowish brown and strong brown. The substratum to a depth of 70 inches is gray sandy clay loam mottled with yellowish brown.

Unless limed, Forestdale soils have a very strongly acid to slightly acid subsoil. They have a low content of organic matter and low natural fertility. Permeability is very slow in the subsoil, and the available water capacity is medium. The seasonal high water table is at the surface or within a depth of 1 foot, and the soils are frequently flooded.

Representative profile of Forestdale silt loam, 1 mile south-southwest of junction of State Routes 720 and 601 and one-quarter mile west of Falling River, north of Brookneal:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few fine flakes of mica; medium acid; clear, smooth boundary.

B1tg—7 to 10 inches, light-gray (10YR 6/1) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; few fine flakes of mica; strongly acid; gradual, smooth boundary.

B21tg—10 to 21 inches, light brownish-gray (2.5Y 6/2) clay; many, coarse, distinct, yellowish-brown (10YR 5/6) mottles and common, medium, faint, light-gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; few fine flakes of mica; very strongly acid; clear, wavy boundary.

B22tg—21 to 48 inches, gray (10YR 5/1) clay; common, coarse, prominent, strong-brown (7.5YR 5/6) mottles and common, coarse, distinct, dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; few fine flakes of mica; very strongly acid; gradual, smooth boundary.

B23tg—48 to 62 inches, gray (N 5/0) clay; many, coarse, prominent, yellowish-brown (10YR 5/6) mottles and few, fine, prominent, strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; firm, slightly sticky and plastic; few thin clay films; few fine flakes of mica; slightly acid; clear, smooth boundary.

IICg—62 to 70 inches, gray (N 5/0) sandy clay loam; common, medium, prominent, yellowish-brown (10YR 5/8) mottles; massive; very friable, slightly sticky and slightly plastic; few fine flakes of mica; slightly acid.

The solum is 40 to more than 60 inches thick. The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 and 2. Depth to bedrock is more than 5 feet. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 0 to 2. In places it is neutral. High-chroma mottles are common throughout the Bt horizon. This horizon is commonly clay, but ranges to silty clay and heavy silty clay loam. The C horizon ranges from sand and gravelly sand to clay.

Forestdale soils are similar to Augusta, Roanoke, and Wehadkee soils. They are grayer in the upper part of the B horizon and have more clay in the B horizon than Augusta soils. Clay minerals in Forestdale soils are montmorillonitic, whereas in Roanoke soils they are mixed. Forestdale soils have more clay in the B horizon than Wehadkee soils.

Forestdale soils are near Augusta, Chewacla, Dogue, State, Wahee, and Wehadkee soils. They have more clay than Chewacla and State soils and are more poorly drained. They are more poorly drained than Dogue and Wahee soils.

Fo—Forestdale silt loam. This soil is in slight depressions on low stream terraces and on flood plains. It is generally away from the stream channel. Slopes are dominantly 0 to 2 percent.

Included with this soil in mapping were scattered small areas of Augusta, Chewacla, Dogue, Wahee, and Wehadkee soils.

Runoff is slow on this Forestdale soil. The soil receives seepage from higher lying areas, has a seasonal high water table at the surface or within a depth of 1 foot, and is frequently flooded.

This soil is used mostly as pasture and woodland. It is poorly suited to cultivated crops because of excessive wetness and flooding. Capability unit Vw–1; woodland group 1w2.

Georgeville Series

The Georgeville series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from sericite schist.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies a 6-inch surface layer of yellowish-brown loam. The subsoil is 52 inches thick. The upper 8 inches is yellowish-red, friable clay loam; the next 21 inches is red, friable clay; and the lower 23 inches is red, friable silty clay loam. The substratum to a depth of 70 inches is red, strongly weathered schist that crushes easily to silt loam.

Unless limed, Georgeville soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Georgeville loam, 2 to 6 percent slopes, eroded, in a stand of cutover hardwoods, two-thirds of a mile west of junction of State Routes 677 and 670 and one-tenth mile south of State Route 670, south of Chandler Mountain:

O1—2 inches to 0, undecomposed and partly decomposed forest litter.

Ap—0 to 6 inches, yellowish-brown (10YR 5/4) loam; weak, fine, granular structure; very friable; many fine roots; few medium roots; strongly acid; clear, wavy boundary.

B1t—6 to 14 inches, yellowish-red (5YR 5/6) clay loam; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few thin clay films; very strongly acid; clear, wavy boundary.

B21t—14 to 22 inches, red (2.5YR 5/6) clay; moderate, medium, subangular blocky structure; friable, slightly sticky and plastic; few fine roots; common thin clay films; very strongly acid; gradual, smooth boundary.

B22t—22 to 35 inches, red (2.5YR 4/6) clay; moderate, fine, subangular blocky structure; friable, slightly sticky and plastic; few fine roots; many moderately thick clay films; very strongly acid; clear, smooth boundary.

B3t—35 to 58 inches, red (2.5YR 4/6) silty clay loam; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films; very strongly acid; gradual, wavy boundary.

C—58 to 70 inches, red (2.5YR 4/6), strongly weathered schist that crushes easily to silt loam; massive; friable; very strongly acid.

The solum is 40 to 70 inches thick. It is less than 1 to about 5 percent angular quartz pebbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. The Bt horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 to 8. It is clay, silty clay, and silty clay loam. It is more than 30 percent silt. The C horizon is multicolored, weathered sericite schist that commonly crushes to silt loam or loam.

Georgeville soils are similar to Cecil, Cullen, Madison, Tatum, and Turbeville soils. They contain more silt and less coarse sand than Cecil and Madison soils. They lack the dark-red Bt horizon typical of Cullen soils. They generally have a thicker solum than Tatum soils and also differ from those soils in clay mineralogy. They lack the dark-red color in the lower part of the Bt horizon that is typical of Turbeville soils.

Georgeville soils are near Abell, Herndon, Manteo, Nason, and Tatum soils. They are better drained than Abell soils and also differ from those soils in not having mottles of chroma 2 in the B horizon. They have a redder B horizon than Herndon and Nason soils. They contain more clay than Manteo soils and have a Bt horizon, which those soils lack.

GeB2—Georgeville loam, 2 to 6 percent slopes, eroded. This soil is on broad, convex ridgetops. It has the profile described as representative of the series. Where slightly eroded, however, the surface layer is as much as 9 inches thick.

Included with this soil in mapping were scattered small areas of Cecil, Cullen, Nason, Tatum, and Turbeville soils. Also included were spots where 15 to 20 percent of the surface is covered with angular quartz pebbles and cobbles.

Runoff is medium on this Georgeville soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

GeC2—Georgeville loam, 6 to 15 percent slopes, eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. Where slightly eroded, the surface layer is as much as 9 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Cecil, Nason, Tatum, and Turbeville soils. Also included were spots where 15 to 20 percent of the surface is covered with angular quartz pebbles and cobbles.

Runoff is medium to rapid on this Georgeville soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–1; woodland group 3o1.

GeE2—Georgeville loam, 15 to 25 percent slopes, eroded. This soil is on short, convex side slopes along drainageways. Where slightly eroded, the surface layer is 6 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Cecil, Nason, and Manteo soils.

Runoff is rapid on this Georgeville soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

GrB—Georgeville-Brockroad loams, 2 to 6 percent slopes. This mapping unit is on broad, convex ridgetops. It is about 45 percent Georgeville soil, 40 percent Brockroad soil, and 15 percent other soils. The surface layer of the Georgeville soil commonly is 6 to 9 inches thick, but the profiles are otherwise similar to the ones described as representative of their respective series.

Included with this unit in mapping were scattered small areas of Masada, Nason, Tatum, and Turbeville soils.

Runoff is medium. Erosion is a moderate hazard in disturbed and exposed or clean-tilled areas.

This mapping unit is used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

Gwinnett Variant

The Gwinnett variant consists of deep, well-drained, gently sloping to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diabase.

In a representative profile the surface layer is dark reddish-brown loam and clay loam 5 inches thick. The subsoil is 48 inches thick. The upper 37 inches is dark-red, firm clay; the lower 11 inches is dark-red, friable clay loam. The substratum to a depth of 60 inches or more is yellowish-brown, strongly weathered greenstone that crushes to loam.

Unless limed, these Gwinnett soils have a strongly acid to medium acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Gwinnett clay loam, thick solum variant, 2 to 6 percent slopes, in a mixed stand of oaks and pine, one-third mile north of junction of State Routes 686 and 687, south-southeast of Yellow Branch:

Ap1—0 to 2 inches, dark reddish-brown (5YR 3/4) heavy loam; moderate, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; medium acid; abrupt, smooth boundary.

Ap2—2 to 5 inches, dark reddish-brown (5YR 3/4) clay loam; weak, fine, subangular blocky structure; friable, sticky and plastic; many fine roots; few medium and coarse roots; strongly acid; clear, smooth boundary.

B21t—5 to 22 inches, dark-red (2.5YR 3/6) clay; moderate, fine, subangular blocky structure; firm, sticky and plastic; common fine roots; few thin clay films; few dark concretions; strongly acid; gradual, smooth boundary.

B22t—22 to 42 inches, dark-red (2.5YR 3/6) clay; moderate, fine, angular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; common dark concretions; strongly acid; gradual, wavy boundary.

B3t—42 to 53 inches, dark-red (2.5YR 3/6) clay loam; moderate, fine, angular blocky structure; friable, slightly sticky and slightly plastic; common thin clay films; 60 percent strongly weathered greenstone; common black stains on rock surfaces; strongly acid; gradual, irregular boundary.

C—53 to 60 inches, yellowish brown (10YR 5/8), strongly weathered greenstone that crushes to loam; massive; firm; dark-red clay flows in seams in upper part; strongly acid.

The solum is 40 to 60 inches thick. Depth to bedrock is more than 5 feet. The A horizon has hue of 5YR or 2.5YR, value of less than 4, and chroma of 2 to 4. The Bt horizon has hue of 2.5YR or 10R, value of less than 4, and chroma of 4 to 6. The B3t horizon is commonly clay loam, but ranges to loam.

These Gwinnett soils are similar to Cullen, Hiwassee, and Turbeville soils. Clay minerals in these Gwinnett soils are kaolinitic, whereas in Cullen and Turbeville, they are mixed. Also, these Gwinnett soils are somewhat darker red throughout the solum than Cullen soils and have a thinner solum than Turbeville soils. They have a thinner B2t horizon than Hiwassee soils, and the Bt horizon is somewhat less sticky and plastic.

These Gwinnett soils are near Bremo, Cullen, Enon, Iredell, and Wilkes soils. They are redder throughout the solum than Bremo, Enon, and Wilkes soils and contain more clay than Bremo and Wilkes soils. They are better drained than Iredell soils and are redder throughout the solum.

GwB—Gwinnett clay loam, thick solum variant, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the variant.

Included with this soil in mapping were scattered small areas of Cullen, Enon, and Mecklenburg soils.

Runoff is medium on this Gwinnett soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is sticky when wet and hard when dry. If worked when too wet, the soil becomes puddled and plowshares do not scour. If worked when too dry, the soil breaks up into clods that are difficult to work down into a seedbed.

This soil is used for corn, small grain, mixed hay, dark tobacco, and pasture. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–3; woodland group 3o1.

GwC—Gwinnett clay loam, thick solum variant, 6 to 15 percent slopes. This soil is on narrow, convex ridgetops and short side slopes. In places the surface layer is 6 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the variant.

Included with this soil in mapping were scattered small areas of Bremo, Cullen, Enon, and Wilkes soils.

Runoff is medium to rapid on this Gwinnett soil. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is sticky when wet and hard when dry. If worked when too wet, the soil becomes puddled and plowshares do not scour. If worked when too dry, the soil breaks up into clods that are difficult to work down into a seedbed.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. It is poorly suited to cultivated crops because of the very severe erosion hazard and the clay loam surface layer. It is better suited to small grain, mixed hay, and pasture. Capability unit IVe–3; woodland group 3o1.

Helena Series

The Helena series consists of deep, moderately well drained, gently sloping to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diorite.

In a representative profile the surface layer is grayish-brown fine sandy loam 8 inches thick. The subsoil is 25 inches thick. The upper 10 inches is light yellowish-brown and yellowish-brown, friable to firm clay loam and clay; the lower 15 inches is light olive-brown, very firm clay mottled with strong brown and light brownish gray. The substratum to a depth of 60 inches is strongly weathered, multicolored hornblende gneiss that crushes easily to fine sandy loam.

Unless limed, Helena soils have a strongly acid to very strongly acid subsoil. They have a low content of

organic matter and low natural fertility. The subsoil is slowly permeable, and the available water capacity is medium. The seasonal high water table is at a depth of 1½ to 2½ feet during wet periods.

Representative profile of Helena fine sandy loam, 2 to 6 percent slopes, 1 mile southwest of junction of States Routes 681 and 682, east of New London:

Ap—0 to 8 inches, grayish-brown (2.5Y 5/2) fine sandy loam; weak, fine, granular structure; very friable, slightly plastic; many fine roots; few pebbles and cobbles; medium acid; abrupt, wavy boundary.

B1t—8 to 13 inches, light yellowish-brown (2.5Y 6/4) clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; common fine and medium pebbles; strongly acid; clear, wavy boundary.

B21t—13 to 18 inches, yellowish-brown (10YR 5/6) clay; weak, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; few fine flakes of mica; very strongly acid; clear, wavy boundary.

B22t—18 to 24 inches, light olive-brown (2.5Y 5/4) clay; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; moderate, fine, subangular blocky structure; very firm, sticky and very plastic; few fine roots; common thin clay films; few fine flakes of mica; very strongly acid; clear, wavy boundary.

B23t—24 to 33 inches, light olive-brown (2.5Y 5/4) clay; few, fine, faint, light brownish-gray (2.5Y 6/2) mottles and few, fine, distinct, strong-brown (7.5YR 5/6) mottles; moderate, fine, subangular blocky structure; very firm, sticky and very plastic; few fine roots; common thin clay films; few fine flakes of mica; very strongly acid; clear, irregular boundary.

C—33 to 60 inches, multicolored, brown, light-gray, and yellowish-brown, strongly weathered hornblende gneiss that crushes easily to fine sandy loam; massive; friable; common fine flakes of mica; light brownish-gray and gray clay flows in seams; very strongly acid.

The solum is 30 to 40 inches thick. Angular quartz pebbles and cobbles make up less than 1 to about 10 percent of the A and B1t horizons. Depth to bedrock is more than 5 feet. The A horizon has hue of 2.5Y or 10YR, value of 5 and 6, and chroma of 1 to 3. The Bt horizon has hue of 10YR or 2.5Y, value of 5 and 6, and chroma of 4 to 8. Mottles of chroma 2 or less are in the upper 24 inches of the Bt horizon. High-chroma mottles are common in the lower part of the Bt horizon. The C horizon is strongly weathered, multicolored greenstone, hornblende gneiss, or diorite that crushes easily to fine sandy loam or loam.

Helena soils are similar to Dogue, Iredell, Vance, and White Store soils. They have a thinner solum than Dogue soils and are more sticky and plastic in the Bt horizon. They have less than 35 percent base saturation, whereas Iredell and White Store soils have more than 35 percent. They are less well drained than Vance soils and also differ from those soils in having low-chroma mottles in the upper 24 inches of the Bt horizon.

Helena soils are near Appling, Cullen, Enon, Iredell, Vance, and Wilkes soils. They are less well drained than Appling, Cullen, Enon, and Wilkes soils and contain more clay than Wilkes soils.

HaB—Helena fine sandy loam, 2 to 6 percent slopes. This soil is in small areas on slightly convex ridgetops. It has the profile described as representative of the series. Where moderately eroded, however, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Appling, Enon, Fluvanna, Mecklenburg, and Vance soils.

Runoff is medium on this Helena soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The seasonal high water table is at a depth of 1½ to 2½ feet, and drainage is sometimes beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, bright tobacco, and pasture. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIe–4; woodland group 3w1.

HaC—Helena fine sandy loam, 6 to 15 percent slopes. This soil is in small areas on short side slopes. Where moderately eroded, the surface layer is only 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Enon, Fluvanna, Mecklenburg, Vance, and Wilkes soils.

Runoff is medium to rapid on this Helena soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The seasonal high water table is at a depth of 1½ to 2½ feet.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIe–4; woodland group 3w1.

Herndon Series

The Herndon series consists of deep, well-drained, gently sloping to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from sericite schist.

In a representative profile about 3 inches of undecomposed and partly decomposed forest litter overlies a 6-inch surface layer of light yellowish-brown loam. The subsoil is 42 inches thick. The upper 28 inches is yellowish-red, friable clay; the lower 14 inches is yellowish-red, friable clay loam mottled with reddish yellow. The substratum to a depth of 72 inches is strongly weathered, multicolored schist that crushes to silt loam.

Unless limed, Herndon soils have a very strongly acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Herndon loam, 2 to 6 percent slopes, in a stand of mixed hardwoods, nine-tenths of a mile east and one-fifth mile north of junction of State Routes 761 and 705, south of Gladys:

O1—3 inches to 0, undecomposed and partly decomposed forest litter.

Ap—0 to 6 inches, light yellowish-brown (10YR 6/4) loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots few medium and coarse roots; few to common fine angular quartz pebbles; very strongly acid; clear, smooth boundary.

B21t—6 to 19 inches, yellowish-red (5YR 5/6) clay; moderate, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few medium and coarse roots; thin, continuous clay films; few strongly weathered schist fragments; very strongly acid; gradual, smooth boundary.

B22t—19 to 34 inches, yellowish-red (5YR 5/6) light clay; moderate, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; many thin clay films; few strongly weathered schist fragments; very strongly acid; gradual, wavy boundary.

B3t—34 to 48 inches, yellowish-red (5YR 5/6) heavy clay loam; few, fine, distinct, reddish-yellow (7.5YR 6/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few thin clay films; 20 percent strongly weathered schist fragments; very strongly acid; clear, wavy boundary.

C—48 to 72 inches, multicolored yellowish-red, reddish-yellow, white, and red strongly weathered schist that crushes to silt loam; massive; friable; very strongly acid.

The solum is 40 to 60 inches thick. It is less than 1 to 5 percent fine, angular quartz pebbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 5 or 6; and chroma of 2 to 4. The Bt horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. In places high-chroma mottles are in the lower part of the Bt horizon. The Bt horizon is commonly clay, but ranges to clay loam and silty clay loam. It is more than 30 percent silt or 40 percent silt and very fine sand.

Herndon soils are similar to Appling, Masada, Mayodan, Nason, and Vance soils. They contain more silt and less sand in the upper 24 inches of the Bt horizon than Appling and Mayodan soils. Clay minerals in Herndon soils are kaolinitic, whereas in Masada and Vance soils they are mixed. Herndon soils have a thicker B2t horizon than Nason soils and also differ from those soils in mineralogy.

Herndon soils are near Georgeville, Manteo, Nason, and Tatum soils. They have a yellower B horizon than Georgeville and Tatum soils. They contain more clay than Manteo soils and have a Bt horizon, which those soils lack.

HdB—Herndon loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Nason, and Tatum soils. Also included were spots where 15 to 20 percent of the surface is covered with angular quartz pebbles.

Runoff is medium on this Herndon soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used mostly as woodland, but small areas are used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, the soil is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

HdC—Herndon loam, 6 to 10 percent slopes. This soil is on narrow, winding, convex ridgetops and on complex side slopes. Where moderately eroded, the surface layer is only 4 to 5 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Manteo, Nason, and Tatum soils. Also included were spots where 15 to 20 percent of the surface is covered with angular quartz fragments.

Runoff is medium on this Herndon soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used mostly as woodland, but small areas are used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, the soil is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

Hiwassee Series

The Hiwassee series consists of deep, well-drained, gently sloping to moderately steep soils that have a clayey subsoil. These soils are on the Piedmont Upland. They formed in the older alluvium that is commonly higher than, and some distance from, present flood plains.

In a representative profile the surface layer is dark reddish-brown loam 7 inches thick. The subsoil is dark-red, firm clay 53 inches thick. The substratum to a depth of 70 inches is dark-red very gravelly clay loam.

Unless limed, Hiwassee soils have a medium acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Hiwassee loam, 2 to 6 percent slopes, eroded, one-fifth mile south of junction of State Routes 633 and 728, southeast of Long Island:

Ap—0 to 7 inches, dark reddish-brown (5YR 3/4) heavy loam; moderate, fine, granular structure; friable, slightly sticky and slightly plastic; many fine and medium roots; few fine rounded pebbles; medium acid; abrupt, smooth boundary.

B21t—7 to 17 inches, dark-red (2.5YR 3/6) clay; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; few black concretions; few fine rounded pebbles; medium acid; clear, smooth boundary.

B22t—17 to 60 inches, dark-red (10R 3/6) clay; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; few black concretions; few fine rounded pebbles; medium acid; clear, smooth boundary.

IIC—60 to 70 inches, dark-red (10R 3/6) very gravelly clay loam; massive; firm, sticky and plastic; strongly acid.

The solum is 40 to more than 60 inches thick. Fine rounded quartz pebbles make up less than 1 to about 5 percent of the solum and 20 to 50 percent of the substratum. Depth to bedrock is more than 5 feet. The A horizon has hue of 5YR or 2.5YR, value of less than 4, and chroma of 2 to 4. The Bt horizon has hue of 2.5YR or 10R, value of less than 4, and chroma of 4 to 6. The C horizon ranges from dark red and red to strong brown and yellowish brown. It ranges from sandy clay loam to clay and is commonly gravelly or very gravelly.

Hiwassee soils are similar to Cullen, Gwinnett, and Turbeville soils. Clay minerals in Hiwassee soils are kaolinitic, whereas in Cullen and Turbeville soils they are mixed. Also, Hiwassee soils are darker red throughout the solum than Cullen and Turbeville soils. They have a thicker B2t horizon than Gwinnett soils, and the Bt horizon is more sticky and plastic.

Hiwassee soils are near Masada and Turbeville soils. They are redder throughout the solum than Masada soils.

HwB2—Hiwassee loam, 2 to 6 percent slopes, eroded. This soil is on broad, slightly convex ridgetops on high stream terraces. It has the profile de-

scribed as representative of the series. Where more severely eroded, however, the surface layer is clay loam.

Included with this soil in mapping were scattered small areas of Masada and Turbeville soils. Also included were spots where the slope is less than 2 percent.

Runoff is medium on this Hiwassee soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and dark tobacco. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

HwC2—Hiwassee loam, 6 to 15 percent slopes, eroded. This soil is on the narrow side slopes of high stream terraces and at terrace breaks. Where more severely eroded, the surface layer is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Turbeville soil.

Runoff is medium to rapid on this Hiwassee soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, dark tobacco, and pasture (fig. 2). If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–1; woodland group 3o1.

HwE2—Hiwassee loam, 15 to 25 percent slopes, eroded. This soil is on the narrow side slopes of high stream terraces and at terrace breaks. Where more severely eroded, the surface layer is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Turbeville soil.

Runoff is rapid on this Hiwassee soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is commonly used as pasture and woodland. It is poorly suited to cultivated crops because

Figure 2.—A good stand of oats and alfalfa on Hiwassee loam, 6 to 15 percent slopes, eroded, one of the better soils in the survey area for farming. Manteo channery loam, 25 to 60 percent slopes, is in the wooded area just below Cecil fine sandy loam, 6 to 15 percent slopes, on the ridgetop.

of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

Iredell Series

The Iredell series consists of deep, moderately well drained to somewhat poorly drained, gently sloping to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diabase.

In a representative profile the surface layer is dark grayish-brown loam 8 inches thick. The subsoil is 17 inches thick. The upper 5 inches is yellowish-brown, friable clay loam; the lower 12 inches is yellowish-brown, firm clay. The substratum, to a depth of 42 inches, is olive, black, and yellow greenstone that crushes easily to friable loam. Greenstone is at a depth of 42 inches.

Iredell soils have a medium acid to moderately alkaline subsoil. They have a low content of organic matter and medium natural fertility. The subsoil is slowly permeable, and the available water capacity is medium. The seasonal high water table is at a depth of 1½ to 2½ feet during wet periods.

Representative profile of Iredell loam, 2 to 6 percent slopes, 1 mile east and one-fifth mile south of junction of State Routes 615 and 646, south of Spring Hill:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; many dark concretions; neutral; abrupt, smooth boundary.

B1t—8 to 13 inches, yellowish-brown (10YR 5/4) clay loam; weak, fine, subangular blocky structure; friable, sticky and slightly plastic; many fine roots; few thin clay films; many dark concretions; neutral; abrupt, smooth boundary.

B21t—13 to 16 inches, yellowish-brown (10YR 5/4) clay; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; moderate, fine, subangular blocky structure; firm, very sticky and very plastic; few fine and medium roots; moderately thick, continuous clay films; neutral; abrupt, smooth boundary.

B22t—16 to 25 inches, yellowish-brown (10YR 5/6) clay; moderate, medium, subangular blocky structure; firm, very sticky and very plastic; few fine roots; moderately thick, continuous clay films; neutral; gradual, wavy boundary.

C—25 to 42 inches, mixed olive (5Y 4/4), black (N 2/0), and yellow (10YR 7/6), weathered greenstone that crushes easily to loam; massive; friable; clay flows in seams; neutral.

R—42 inches, weathered greenstone.

The solum is 20 to 36 inches thick. Depth to bedrock ranges from 3½ to 5 feet. The A and B1t horizons have few to many, fine, dark-colored oxide concretions. The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The B1t horizon has hue of 10YR or 2.5Y, value of 4 and 5, and chroma of 4 to 6. It is commonly clay loam, but ranges to silty clay loam. The B2t horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 to 6. The C horizon is commonly weathered, multicolored greenstone, hornblende gneiss, or diabase that crushes to loam, clay loam, or silty clay loam.

Iredell soils are similar to Enon, Elbert, Helena, and White Store soils. Clay minerals in Iredell soils are montmorillonitic whereas in Enon, Helena, and White Store soils they are mixed. Also, Iredell soils are less well drained than Enon soils. They have more than 35 percent base saturation, whereas Helena soils have less than 35 percent. They are better drained than Elbert soils and are not so gray throughout the solum.

Iredell soils are near Bremo, Cullen, Elbert, Enon, Helena, Mecklenburg, and Wilkes soils. They are less well drained than Bremo and Wilkes soils and have more clay. They are less well drained than Cullen and Mecklenburg soils and have a yellower B horizon.

IrB—Iredell loam, 2 to 6 percent slopes. This soil is on broad, slightly convex ridgetops. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Elbert, Enon, and Helena soils. Also included were spots where a concretionary layer is just below the surface layer.

Runoff is medium on this Iredell soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled. The seasonal high water table is at a depth of 1½ to 2½ feet, and artificial drainage is sometimes beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately drained, limed, and fertilized, it is suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIe–4; woodland group 4w2.

IrB2—Iredell loam, 2 to 6 percent slopes, eroded. This soil is on broad, slightly convex ridgetops. The surface layer is 3 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cullen, Elbert, Enon, Helena, and Mecklenburg soils.

Runoff is medium on this Iredell soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The seasonal high water table is at a depth of 1½ to 2½ feet, and artificial drainage is sometimes beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, and pasture. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IVe–4; woodland group 4w2.

IrC—Iredell loam, 6 to 10 percent slopes. This soil is on narrow to wide slopes along drainageways.

Included with this soil in mapping were scattered small areas of Bremo, Cullen, Enon, Mecklenburg, and Wilkes soils. Also included were spots where a concretionary layer is just below the surface layer.

Runoff is medium on this Iredell soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The soil has a seasonal high water table at a depth of 1½ to 2½ feet.

This soil is used for corn, small grain, mixed hay, and as pasture. If adequately limed and fertilized, it is moderately well suited to most locally grown crops.

If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IVe–4; woodland group 4w2.

IrC2—Iredell loam, 6 to 10 percent slopes, eroded. This soil is on narrow side slopes along drainageways. The surface layer is 2 to 4 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Bremo, Cullen, Enon, Mecklenburg, and Wilkes soils.

Runoff is medium on this Iredell soil. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled. The soil has a seasonal high water table at a depth of 1½ to 2½ feet.

This soil is used mostly as pasture and woodland. It is poorly suited to cultivated crops and is better suited to small grain, mixed hay, pasture, and woodland. Capability unit IVe–4; woodland group 4w2.

Louisburg Series

The Louisburg series consists of moderately deep, well-drained to excessively drained, sloping to steep soils that have a loamy subsoil. These soils are on the Piedmont Upland. They formed in material weathered from granite, granite gneiss, and quartzite.

In a representative profile the surface layer is light yellowish-brown fine sandy loam 7 inches thick. The subsoil is light yellowish-brown, friable loam 10 inches thick. It has lenses and pockets of yellowish-brown clay loam. The substratum, to a depth of 40 inches, is strongly weathered granite gneiss that crushes to fine sandy loam. Granite gneiss is at a depth of 40 inches.

Unless limed, Louisburg soils are very strongly acid to medium acid. They have a low content of organic matter and low natural fertility. The subsoil is rapidly permeable, and the available water capacity is low.

Representative profile of Louisburg fine sandy loam, 15 to 25 percent slopes, in a stand of small pines, nine-tenths of a mile northeast of the junction of Highway 40 and State Route 600, about 600 feet northwest of Dog Creek, northeast of Brookneal:

Ap—0 to 7 inches, light yellowish-brown (2.5Y 6/4) fine sandy loam; weak, fine, granular structure; friable; many fine roots; few medium and coarse roots; few fine flakes of mica; few fine angular quartz pebbles; medium acid; abrupt, smooth boundary.

B—7 to 17 inches, light yellowish-brown (2.5Y 6/4) loam; small lenses and pockets of yellowish-brown (10YR 5/6) clay loam; few thin clay films; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; common fine flakes of mica; few fine angular quartz pebbles; about 50 percent strongly weathered granite gneiss that crushes easily to loam; very strongly acid; clear, smooth boundary.

C—17 to 40 inches, strongly weathered yellowish, brownish, and whitish granite gneiss that crushes to fine sandy loam; massive; friable; few fine roots; common fine flakes of mica; strongly acid.

R—40 inches, granite gneiss.

The solum is 16 to 30 inches thick. It is less than 1 to about 35 percent angular quartz pebbles and quartz, granite, and granite gneiss cobbles and stones. Depth to bedrock ranges from 24 to 48 inches. The A horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 to 4. The B horizon has hue of 2.5Y, 10YR, or 7.5YR; value of 4 to 6; and chroma of 3 to 6. It ranges from loam and fine sandy loam to gravelly, cobbly, or stony sandy loam. Lenses or small pockets of yellowish-brown or yellowish-red clay loam, sandy clay loam, or loam are in the B horizon. The C horizon is multicolored, strongly weathered granite, granite gneiss, or quartzite that crushes to fine sandy loam or gravelly, cobbly, or stony sandy loam.

Louisburg soils are similar to Bremo, Manteo, Pinkston, Tallapoosa, and Wilkes soils. They differ from Bremo soils in having lenses and small pockets of finer textured material in the B horizon and in having fewer coarse fragments throughout. They have a thicker solum than Manteo soils and are deeper over bedrock. They have a yellower solum than Pinkston soils. They lack the continuous Bt horizon typical of Tallapoosa and Wilkes soils.

Louisburg soils are near Appling, Cecil, Fluvanna, and Vance soils. They are more excessively drained than those soils and have a thinner solum. Also, they lack the continuous Bt horizon of those soils.

LoD—Louisburg fine sandy loam, 6 to 15 percent slopes. This soil is on narrow, winding, convex ridgetops and on complex side slopes. In places the surface layer is gravelly or cobbly sandy loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Cecil, Tallapoosa, and Wilkes soils. Also included were spots where the slope is less than 6 percent.

Runoff is medium to rapid on this Louisburg soil. The soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, bright tobacco, and woodland. It is poorly suited to cultivated crops because of the droughtiness, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, pasture, and woodland. Capability unit IVe–2; woodland group 3o2.

LoE—Louisburg fine sandy loam, 15 to 25 percent slopes. This soil is on short, convex side slopes along drainageways and on complex mountain slopes. It has the profile described as representative of the series, but in places the surface layer is gravelly or cobbly sandy loam.

Included with this soil in mapping were scattered small areas of Appling, Cecil, Tallapoosa, and Wilkes soils.

Runoff is rapid on this Louisburg soil. The soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is used mostly as woodland, but small areas are pastured. The soil is suited to drought-resistant grasses and trees. Capability unit VIe–2; woodland group 3r2.

LoF—Louisburg fine sandy loam, 25 to 60 percent slopes. This soil is on short, convex side slopes along drainageways and on complex mountain slopes. In places the surface layer is gravelly, cobbly, or stony

sandy loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Tallapoosa and Wilkes soils. Also included were small areas where the soil is less than 24 inches deep over bedrock.

Runoff is rapid on this Louisburg soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is used as woodland. Capability unit VIIe–1; woodland group 3r2.

Madison Series

The Madison series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from mica schist and quartz mica schist.

In a representative profile about 1 inch of forest litter overlies a 5-inch surface layer of loam. The upper 1 inch is very dark grayish brown, and the lower 4 inches is brown. The subsoil is 25 inches thick. The upper 3 inches is yellowish-red, friable loam; the next 12 inches is red, friable clay; and the lower 10 inches is red, friable loam mottled with reddish yellow and dark red. The substratum, to a depth of 48 inches, is multicolored, strongly weathered schist that crushes easily to loam. Mica schist is at a depth of 48 inches.

Unless limed, Madison soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Madison loam, 2 to 6 percent slopes, eroded, in a mixed stand of hardwoods and pine, one-half mile west of junction of State Routes 703 and 633, 50 yards south of State Route 633, southeast of Marysville:

O1—1 inch to 0, hardwood litter.

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; very friable; many fine and medium roots; common fine flakes of mica; few fine quartz pebbles; strongly acid; abrupt, smooth boundary.

A2—1 inch to 5 inches, brown (7.5YR 5/4) loam; weak, fine, granular structure; very friable; common fine and medium roots; common fine flakes of mica; common fine quartz pebbles; strongly acid; clear, smooth boundary.

B1t—5 to 8 inches, yellowish-red (5YR 4/6) heavy loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few thin clay films; common fine flakes of mica; few fine quartz pebbles; very strongly acid; clear, smooth boundary.

B2t—8 to 20 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; friable, slightly sticky and plastic; few fine roots; many thin clay films; common fine flakes of mica; very strongly acid; clear, irregular boundary.

B3t—20 to 30 inches, red (2.5YR 4/6) heavy loam; common, fine, reddish-yellow (5YR 6/8) and dark-red (10R 3/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; many fine flakes of mica; common small strongly weathered schist fragments; very strongly acid; clear, wavy boundary.

C—30 to 48 inches, red (2.5YR 4/6), reddish-yellow (5YR 7/6), and white (10YR 8/2) strongly weathered schist that crushes easily to loam; massive; friable; many fine flakes of mica; very strongly acid.

R—48 inches, mica schist.

The solum is 24 to 40 inches thick. It is less than 1 to about 15 percent angular quartz pebbles. Depth to bedrock is 3 to 5 feet or more. The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. The Bt horizon has hue of 5YR, 2.5YR, or 10R; value of 4 to 6; and chroma of 6 to 8. The B2t horizon is commonly clay, but ranges to heavy clay loam. The C horizon is multicolored, strongly weathered mica schist or quartz mica schist that crushes to loam or fine sandy loam.

Madison soils are similar to Cecil, Cullen, Georgeville, Tatum, and Turbeville soils. They have a thinner solum than Cecil, Cullen, and Turbeville soils and have more mica throughout. They contain less silt and more sand than Georgeville and Tatum soils. Clay minerals in Madison soils are kaolinitic, whereas in Tatum soils they are mixed.

Madison soils are near Abell, Appling, Cecil, Cullen, Tallapoosa, and Worsham soils. They are better drained than Abell and Worsham soils. They have more mica in the Bt horizon than Appling and Tallapoosa soils and have more clay in the B horizon than Tallapoosa soils.

MaB2—Madison loam, 2 to 6 percent slopes, eroded. This soil is on broad, convex ridgetops. It has the profile described as representative of the series, but in some slightly eroded areas the surface layer is 6 to 8 inches thick and in some more severely eroded areas it is clay loam.

Included with this soil in mapping were scattered small areas of Appling, Cecil, Cullen, and Tallapoosa soils.

Runoff is medium on this Madison soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

MaC2—Madison loam, 6 to 15 percent slopes, eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. In some only slightly eroded areas the surface layer is 6 to 8 inches thick and in some more severely eroded areas it is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Cecil, Cullen, and Tallapoosa soils.

Runoff is medium to rapid on this Madison soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–1; woodland group 3o1.

MaE2—Madison loam, 15 to 25 percent slopes, eroded. This soil is on short, convex side slopes along drainageways. Where more severely eroded, the sur-

face layer is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Cecil, Cullen, Tallapoosa, and Wedowee soils.

Runoff is rapid on this Madison soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is mostly used as pasture and woodland. It is poorly suited to cultivated crops because of the droughtiness, the slope, and the very severe erosion hazard. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

Manteo Series

The Manteo series consists of shallow, somewhat excessively drained, sloping to steep soils that have a loamy subsoil. These soils are on the Piedmont Upland. They formed in material weathered from sericite schist.

In a representative profile about 2 inches of undecomposed and decomposed forest litter overlies a 10-inch surface layer of channery loam. The upper 1 inch is dark-brown, and the lower 9 inches is strong brown. The subsoil is 5 inches of yellowish-red, friable channery light clay loam. Sericite schist is at a depth of 15 inches.

Manteo soils are strongly acid to very strongly acid. They have a low content of organic matter and low natural fertility. Permeability is moderately rapid, and the available water capacity is low.

Representative profile of Manteo channery loam, 25 to 60 percent slopes, in a stand of cutover hardwoods, 300 feet north and 300 feet east of junction of State Route 670 and road to airport beacon on Candlers Mountain:

O1—2 inches to 1 inch, undecomposed leaves and twigs.
O2—1 inch to 0, decomposed forest litter laced with fine and medium roots.
A1—0 to 1 inch, dark-brown (10YR 4/3) channery loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; strongly acid; abrupt, smooth boundary.
A2—1 inch to 10 inches, strong-brown (7.5YR 5/6) channery loam; weak, fine, granular structure; very friable slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; strongly acid; clear, smooth boundary.
B—10 to 15 inches, yellowish-red (5YR 5/6) channery light clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; very strongly acid; abrupt, broken boundary.
R—15 inches, sericite schist.

The solum is 10 to 20 inches thick. In most places thin, flat fragments of schist make up 20 to 35 percent of the A horizon and 35 to 50 percent of the B horizon. In places a few quartz and quartzite pebbles are on the surface and in the solum. Depth to bedrock ranges from 12 to 20 inches. The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. The B horizon has hue of 5YR, 7.5YR, or 10YR; value of 4 or 5; and chroma of 6 to 8. It ranges from light clay loam to loam and silt loam, all of which are channery and very channery. In places a C horizon occurs. It is strongly weathered schist, 2 to 6 inches thick, that crushes to very channery loam or very channery silt loam.

Manteo soils are similar to Bremo, Louisburg, and Pinkston soils. They are less than 20 inches deep over bedrock, whereas those soils are more than 20 inches deep over bedrock.

Manteo soils are near Abell, Nason, and Tatum soils, all of which are more than 20 inches deep over bedrock. They lack the continuous Bt horizon typical of those soils.

McD—Manteo channery loam, 6 to 15 percent slopes. This soil is on narrow, winding, convex ridgetops and on complex side slopes. In places the surface layer is 6 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Nason, Tallapoosa, Tatum, and Wilkes soils. Also included were small areas where the soil is less than 10 or more than 20 inches deep over bedrock and small areas where the slope is less than 6 percent.

Runoff is medium to rapid on this Manteo soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is suited to drought-resistant pasture grasses and trees. Capability unit VIe–2; woodland group 4d1.

McE—Manteo channery loam, 15 to 25 percent slopes. This soil is on short to moderately long, convex side slopes along drainageways and on complex mountain slopes. The surface layer is 6 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Nason, Tallapoosa, Tatum, and Wilkes soils. Also included were small areas where the soil is less than 10 or more than 20 inches deep over bedrock.

Runoff is rapid on this Manteo soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed (fig. 3).

This soil is used mostly as woodland. Capability unit VIIe–1; woodland group 4d2.

McF—Manteo channery loam, 25 to 60 percent slopes. This soil is on short to moderately long, convex side slopes and on complex mountain slopes. It has the profile described as representative of the series, but in places the surface layer is 4 to 8 inches thick.

Included with this soil in mapping were scattered small areas of Tallapoosa and Wilkes soils. Also included were small areas of Rock outcrop and small areas where the soil is less than 10 inches deep over bedrock.

Runoff is rapid on this Manteo soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is used mostly as woodland. Capability unit VIIe–1; woodland group 4d2.

MNE—Manteo-Rock outcrop complex, steep. This mapping unit is mostly on short to moderately long, convex side slopes along drainageways and on complex

Figure 3.—**Manteo channery loam, 15 to 25 percent slopes, exposed in a road cut. The schist is vertically oriented, and the soil is less than 20 inches thick. Small fragments of weathered schist occur in the soil and on the surface.**

mountain slopes. It is about 45 percent Manteo soil, 40 percent Rock outcrop, and 15 percent other soils. Slopes range from about 25 to 60 percent.

Included with this unit in mapping were scattered small areas of Louisburg and Wilkes soils. Also included were small areas where the soil is less than 10 inches deep over bedrock and small areas where it is very stony.

Runoff is rapid, and this mapping unit is droughty during the growing season. Erosion is a very severe hazard in disturbed and exposed areas.

This mapping unit is used mostly as woodland. Capability unit VIIe–1; woodland group 5d1.

Masada Series

The Masada series consists of deep, well-drained, nearly level to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in the older alluvium that is often higher than, and some distance from, present flood plains.

In a representative profile the surface layer is light olive-brown fine sandy loam 11 inches thick. The subsoil is 72 inches thick. The upper 4 inches is yellowish-brown, friable clay loam; the next 38 inches is yellowish-brown, friable clay mottled with yellowish red in the lower part; the next 18 inches is mottled red, strong-brown, yellowish-brown, and light-gray, firm sandy clay loam; and the lower 12 inches is red, friable sandy clay loam mottled with strong brown and brownish yellow.

Unless limed, Masada soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Masada fine sandy loam, 2 to 6 percent slopes, 1.1 miles north-northeast of junction of State Routes 600 and 601 and 30 feet east of State Route 600, northeast of Morris Church:

Ap—0 to 11 inches, light olive-brown (2.5Y 5/4) fine sandy loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few fine subrounded quartz pebbles; medium acid; abrupt, smooth boundary.

B1t—11 to 15 inches, yellowish-brown (10YR 5/6) clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few thin clay films; few fine subrounded quartz pebbles; strongly acid; gradual, smooth boundary.

B21t—15 to 28 inches, yellowish-brown (10YR 5/6) clay; moderate, fine, subangular blocky structure; friable, sticky and slightly plastic; common fine roots; common thin clay films; few fine subrounded quartz pebbles; very strongly acid; gradual, smooth boundary.

B22t—28 to 53 inches, yellowish-brown (10YR 5/8) clay; many, coarse, distinct, yellowish-red (5YR 4/8) mottles; moderate, fine, subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common thin clay films; few fine subrounded quartz pebbles; very strongly acid; gradual, smooth boundary.

B31t—53 to 71 inches, mottled red (2.5YR 4/8), strong-brown (7.5YR 5/6), light-gray (10YR 7/2), and yellowish-brown (10YR 5/4) sandy loam; weak, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; few thin clay films; few fine subrounded quartz pebbles; slightly compact in place; very strongly acid; gradual, smooth boundary.

B32t—71 to 83 inches, red (2.5YR 4/6) sandy clay loam; common, coarse, distinct, strong-brown (7.5YR 5/6) mottles and common, medium, prominent, brownish-yellow (10YR 6/8) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films; few fine subrounded quartz pebbles; very strongly acid.

The solum is more than 60 inches thick. It is about 2 to 35 percent subrounded quartz pebbles and cobbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4. It is commonly fine sandy loam, gravelly fine sandy loam, and loam. The B1t and B2t horizons have hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 6 to 8. They are commonly clay, but range to clay loam. The B3t horizon is mottled in red, yellowish red, gray, strong brown, yellowish brown, and brownish yellow. It ranges from sandy clay loam to clay.

Masada soils are similar to Brockroad, Hiwassee, and Turbeville soils. They lack the IIBt horizon typical of Brockroad soils. They are not so red throughout the solum as Hiwassee soils. They lack the dark red color in the lower part of the Bt horizon that is typical of Turbeville soils.

Masada soils are near Appling, Cecil, Georgeville, Turbeville, and Vance soils. They have a thicker solum than Appling, Cecil, Georgeville, and Vance soils and are not so red throughout as Cecil and Georgeville soils.

MpB—Masada fine sandy loam, 2 to 6 percent slopes. This soil is on broad, slightly convex to slightly concave ridgetops. It has the profile described as representative of the series, but where moderately eroded, the surface layer is only 6 to 10 inches thick.

Included with this soil in mapping were scattered small areas of Abell, Appling, Turbeville, and Vance soils. Also included were small areas where the slope is less than 2 percent.

Runoff is medium on this Masada soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. It is especially suited to bright tobacco. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

MpC—Masada fine sandy loam, 6 to 15 percent slopes. This soil is on broad, convex ridgetops and on short, complex side slopes. Where moderately eroded, the surface layer is only 4 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Turbeville, and Vance soils.

Runoff is medium to rapid on this Masada soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and tobacco. It is especially suited to bright tobacco. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

MrB—Masada gravelly fine sandy loam, 2 to 6 percent slopes. This soil is on broad, slightly convex to slightly concave ridgetops. The surface layer is 15 to 35 percent mainly quartz pebbles and some cobbles and in places is 4 to 8 inches thick. The profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Abell, Appling, Mayodan, and Turbeville soils.

Runoff is medium on this Masada soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled. The surface layer is pebbly enough to damage and dull plowshares.

This soil is used for corn, small grain, mixed hay, pasture, tobacco, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

MrC—Masada gravelly fine sandy loam, 6 to 10 percent slopes. This soil is on broad, convex ridgetops and short, complex side slopes. The surface layer is 15 to 35 percent mainly quartz pebbles and some cobbles and in places is 4 to 8 inches thick. The profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Mayodan, and Turbeville soils.

Runoff is medium on this Masada soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is pebbly enough to damage and dull plowshares.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

MsB2—Masada loam, 2 to 6 percent slopes, eroded. This soil is on small terraces near streams. The surface layer is 5 to 9 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Dogue, Hiwassee, State, and Turbeville soils.

Runoff is medium on this Masada soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

MsC2—Masada loam, 6 to 12 percent slopes, eroded. This soil is on small terraces near streams. The surface layer is 4 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Dogue, Hiwassee, and Turbeville soils.

Runoff is medium to rapid on this Masada soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

MtB—Masada loam, local alluvium, 0 to 4 percent slopes. This soil is along drainageways, at the heads of drainageways, and at the base of slopes. The surface layer is 8 to 12 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Abell, Elbert, Hiwassee, and Worsham soils.

Runoff is slow on this Masada soil. The soil receives seepage from higher lying areas, has a seasonal high water table at a depth of about 4 feet for brief periods, and in places is occasionally flooded.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIw–1; woodland group 2o1.

Mayodan Series

The Mayodan series consists of deep, well-drained, gently sloping to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from Triassic sandstone and shale.

In a representative profile the surface layer is 8 inches of fine sandy loam that is dark brown in the upper part and yellowish brown in the lower part. The subsoil is 44 inches thick. The upper 3 inches is brown, friable clay loam; the next 21 inches is yellowish-red, friable clay; the lower 20 inches is yellowish-red, friable clay loam. The substratum to a depth of 60 inches is yellowish-red and brown, weathered sandstone and shale that crush to loam.

Unless limed, Mayodan soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Mayodan fine sandy loam, 2 to 6 percent slopes, one-fifth mile east and three-fifths of a mile north of junction of State Routes 635 and 637, east of Long Island:

Ap1—0 to 5 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few medium roots; medium acid; abrupt, smooth boundary.

Ap2—5 to 8 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; friable, slightly sticky and slightly plastic; few fine roots; strongly acid; abrupt, smooth boundary.

B1t—8 to 11 inches, brown (7.5YR 5/4) clay loam; weak, medium, subangular blocky structure; friable, slightly sticky and plastic; few fine and medium roots; few thin clay films; very strongly acid; clear, wavy boundary.

B21t—11 to 18 inches, yellowish-red (5YR 5/6) clay; moderate, medium, subangular blocky structure; friable, slightly sticky and plastic; few fine roots; common thin clay films; very strongly acid; clear, wavy boundary.

B22t—18 to 32 inches, yellowish-red (5YR 4/6) clay; moderate. medium. subangular blocky structure; friable, slightly sticky and plastic; few fine roots; moderately thick, continuous clay films; very strongly acid; clear, wavy boundary.

B3t—32 to 52 inches, yellowish-red (5YR 4/6) clay loam; few, fine, distinct, brown (7.5YR 5/2) mottles; moderate, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films; pockets of weathered sandstone and shale that crush to clay loam; very strongly acid; clear, wavy boundary.

C—52 to 60 inches, yellowish-red and brown weathered sandstone and shale that crush to loam; massive; friable; very strongly acid.

The solum is 40 to 60 inches thick. Fine, angular quartz pebbles make less than 1 to about 30 percent of the A horizon and from less than 1 to 10 percent of the Bt and C horizons. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam or loam. The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It ranges from clay to heavy clay loam. The C horizon is commonly strongly weathered sandstone and shale that crush to loam, sandy loam, silt loam, or clay loam.

Mayodan soils are similar to Appling, Herndon, Masada, Nason, Vance, and Wedowee soils. They have more exchangeable aluminum in the lower part of the Bt horizon than Appling and Wedowee soils. They contain less silt and more sand than Herndon and Nason soils. They have a thinner solum than Masada soils. They have a less firm and plastic Bt horizon than Vance soils. Clay minerals in Mayodan soils are kaolinitic, whereas in Masada and Vance soils they are mixed.

Mayodan soils are near Penn, Pinkston, and White Store soils. They have more clay than Penn and Pinkston soils and have a thicker solum. They are redder throughout than White Store soils and have a less firm and plastic Bt horizon.

MwB—Mayodan fine sandy loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the series. Where moderately eroded, however, the surface layer is only 4 to 6 inches thick. In places it is 20 to 30 percent angular quartz pebbles.

Included with this soil in mapping were scattered small areas of Penn, Pinkston, and White Store soils.

Runoff is medium on this Mayodan soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. It is especially suited to bright tobacco. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

MwC—Mayodan fine sandy loam, 6 to 15 percent slopes. This soil is on narrow, convex ridgetops and on short side slopes. In some moderately eroded areas the surface layer is only 4 to 6 inches thick and in places it is 20 to 30 percent angular quartz pebbles, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Penn and Pinkston soils.

Runoff is medium to rapid on this Mayodan soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, tobacco, and woodland. It is especially suited to bright tobacco. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

MyB2—Mayodan loam, 2 to 6 percent slopes, eroded. This soil is on broad, convex ridgetops and in some higher lying areas of the Triassic lowlands. The surface layer is 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Penn and White Store soils.

Runoff is medium on this Mayodan soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–5; woodland group 3o1.

MyC2—Mayodan loam, 6 to 15 percent slopes, eroded. This soil is on narrow, convex ridgetops and on short side slopes. The surface layer is 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series. Where more severely eroded, the surface layer is clay loam.

Included with this soil in mapping were scattered small areas of Penn soil.

Runoff is medium to rapid on this Mayodan soil.

Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–6; woodland group 3o1.

Mecklenburg Series

The Mecklenburg series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, and diabase.

In a representative profile the surface layer is dark reddish-gray loam 7 inches thick. The subsoil is 36 inches thick. The upper 15 inches is yellowish-red, firm clay; the next 9 inches is yellowish-red, firm clay mottled with light olive brown and red; and the lower 12 inches is yellowish-red, firm clay mottled with red and yellowish brown. The substratum to a depth of 60 inches is strongly weathered pale-yellow and strong-brown basic rock that crushes to loam.

Unless limed, Mecklenburg soils have a medium acid to neutral subsoil. They have a low content of organic matter and medium natural fertility. The subsoil is slowly permeable, and the available water capacity is medium.

Representative profile of Mecklenburg loam, 6 to 15 percent slopes, eroded, one-half mile south and one-tenth mile west of junction of State Route 712 and U.S. Highway 29, north of Mansion:

Ap—0 to 7 inches, dark reddish-gray (5YR 4/2) loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few fine angular quartz pebbles; slightly acid; abrupt, smooth boundary.

B21t—7 to 22 inches, yellowish-red (5YR 4/6) clay; moderate, fine, subangular blocky structure; firm, sticky and plastic; common fine roots; common thin clay films; few fine angular quartz pebbles; many fine dark concretions; medium acid; clear, wavy boundary.

B22t—22 to 31 inches, yellowish-red (5YR 4/6) clay; few, fine, distinct, light olive-brown (2.5Y 5/6) mottles and few, fine, faint, red (2.5YR 4/6) mottles; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; moderately thick, continuous clay films; common angular basic rock cobbles; medium acid; clear, wavy boundary.

B3t—31 to 43 inches, yellowish-red (5YR 5/6) clay; common, medium, distinct, red (2.5YR 4/6) mottles and common, medium, prominent, yellowish-brown (10YR 5/6) mottles; weak, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; few thin clay films; common angular basic rock cobbles; medium acid; clear, wavy boundary.

C—43 to 60 inches, pale-yellow and strong-brown, strongly weathered basic rock that crushes to loam; massive; friable; black concretionary stains on rock faces; thin clay flows in seams; slightly acid.

The solum is 24 to 45 inches thick. It is less than 1 to about 5 percent angular quartz pebbles. In many places cobbles of quartz and cobbles and fragments of greenstone, hornblende gneiss, and diabase make up less than 1 to about 5 percent of the lower part of the Bt horizon and the C horizon. Depth to bedrock is 4 feet or more. The A horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. The Bt horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 4 to 8. High-chroma mottles are common in the lower part of the Bt horizon. The C horizon is commonly multicolored greenstone, hornblende gneiss, or diabase that crushes to loam, silt loam, or fine sandy loam.

Mecklenburg soils are similar to Cullen, Enon, Fluvanna, and Gwinnett soils. They are not so red in the B horizon as Cullen and Gwinnett soils. They are redder throughout than Enon soils. They have more than 35 percent base saturation, whereas Fluvanna soils have less than 35 percent.

Mecklenburg soils are near Bremo, Cullen, Elbert, Enon, Gwinnett, Iredell, and Wilkes soils. They contain more clay than Bremo and Wilkes soils. They are better drained than Elbert and Iredell soils and have a redder B horizon.

MzB2—Mecklenburg loam, 2 to 6 percent slopes, eroded. This soil is on broad, convex ridgetops.

Included with this soil in mapping were scattered small areas of Cullen, Enon, Gwinnett, and Iredell soils.

Runoff is medium on this Mecklenburg soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–2; woodland group 4o2.

MzC2—Mecklenburg loam, 6 to 15 percent slopes, eroded. This soil is on narrow, convex ridgetops and on short side slopes. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Bremo, Cullen, Fluvanna, Iredell, and Wilkes soils.

Runoff is medium to rapid on this Mecklenburg soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–4; woodland group 4o2.

MzE2—Mecklenburg loam, 15 to 25 percent slopes, eroded. This soil is on short, convex side slopes along drainageways.

Included with this soil in mapping were scattered small areas of Bremo, Cullen, and Wilkes soils.

Runoff is rapid on this Mecklenburg soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used mostly as pasture and woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 4r2.

Nason Series

The Nason series consists of deep, well-drained, gently sloping to moderately steep soils that have a dominantly clayey subsoil. These soils are on the Pied-

mont Upland. They formed in material weathered from sericite schist.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies a 7-inch surface layer of loam. The upper 1 inch is dark grayish brown, and the lower 6 inches is yellowish brown. The subsoil is 28 inches thick. The upper 5 inches is strong-brown, friable clay loam; the next 15 inches is yellowish-red, friable silty clay; and the lower 8 inches is yellowish-red, friable silty clay loam. The substratum, to a depth of 50 inches, is yellowish-red, friable loam. Sericite schist is at a depth of 50 inches.

Unless limed, Nason soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Nason loam, 2 to 6 percent slopes, in a stand of mixed hardwoods, 1 mile west of Appomattox County line on State Route 603, east of Spring Hill:

O1—2 inches to 1 inch, loose leaves and twigs.
O2—1 inch to 0, partly decomposed leaves and twigs.
A1—0 to 1 inch, dark grayish-brown (10YR 4/2) loam; weak, fine, granular structure; very friable; many fine roots; few medium roots; strongly acid; abrupt, smooth boundary.
A2—1 inch to 7 inches, yellowish-brown (10YR 5/4) loam; weak, fine, granular structure; very friable, slightly sticky; many fine roots; few coarse roots; few fine angular quartz pebbles; strongly acid; gradual, smooth boundary.
B1t—7 to 12 inches, strong-brown (7.5YR 5/6) light clay loam; weak, fine, subangular block structure; friable, slightly sticky; few fine and coarse roots; few thin clay films; few fine angular quartz pebbles; strongly acid; gradual, smooth boundary.
B2t—12 to 27 inches, yellowish-red (5YR 5/8) silty clay; moderate, fine and medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and coarse roots; thin, continuous clay films; few fragments of weathered schist; few fine flakes of mica; strongly acid; gradual, smooth boundary.
B3t—27 to 35 inches, yellowish-red (5YR 5/8) light silty clay loam; weak, medium, subangular blocky structure; friable, slightly sticky; few fine roots; few thin clay films; many fragments of weathered schist; few fine flakes of mica; very strongly acid; clear, wavy boundary.
C—35 to 50 inches, yellowish-red (5YR 5/6) loam; massive; friable; many weathered schist fragments; many fine flakes of mica; very strongly acid.
R—50 inches, sericite schist.

The solum is about 30 to 50 inches thick. It is less than 1 to about 15 percent angular quartz pebbles. Depth to bedrock is 3½ to 5 feet. The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is commonly silty clay or clay, but ranges to silty clay loam and clay loam. The C horizon is strongly weathered multicolored schist that crushes easily to loam, silt loam, or very fine sandy loam.

Nason soils are similar to Appling and Herndon soils. They contain more silt and less sand than Appling soils. Clay minerals in Nason soils are mixed, whereas in Appling and Herndon soils they are kaolinitic.

Nason soils are near Abell, Georgeville, Herndon, Manteo, and Tatum soils. They are better drained than Abell soils and contain more clay. They are not so red as Georgeville and Tatum soils. They contain more clay than Manteo soils and have a thicker solum.

NaB—Nason loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the series. Where moderately eroded, however, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Appling, Herndon, and Tatum soils.

Runoff is medium on this Nason soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used mostly as woodland, but small areas are used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, the soil is suited to most locally grown crops. Capability unit IIe–4; woodland group 3o1.

NaC—Nason loam, 6 to 15 percent slopes. This soil is on narrow, winding, convex ridgetops and on short, complex side slopes. Where moderately eroded, the surface layer is only 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Herndon, Manteo, and Tatum soils.

Runoff is medium to rapid on this Nason soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used mostly as woodland, but small areas are used for corn, small grain, mixed hay, and pasture. If adequately limed and fertilized, the soil is moderately well suited to most locally grown crops. Capability unit IIIe–2; woodland group 3o1.

NaE—Nason loam, 15 to 25 percent slopes. This soil is on short, convex side slopes along drainageways. Where moderately eroded, the surface layer is only 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Manteo, and Tatum soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is rapid on this Nason soil, and the soil is somewhat droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used mostly as woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

Penn Series

The Penn series consists of moderately deep, well-drained, nearly level to moderately steep soils that have a loamy subsoil. These soils are on the Piedmont Upland. They formed in material weathered from Triassic shale.

In a representative profile the surface layer is dark

reddish-brown silt loam 12 inches thick. The subsoil is dark reddish-brown, friable shaly light silty clay loam 6 inches thick. The substratum, to a depth of 37 inches, is reddish-brown, firm very shaly silt loam. Triassic shale is at a depth of about 37 inches.

Unless limed, Penn soils are medium acid to strongly acid. They have a low content of organic matter and low natural fertility. Permeability is moderate to moderately rapid, and the available water capacity is low.

Representative profile of Penn silt loam, 2 to 6 percent slopes, about 300 feet east of the crossing of State Route 633 over Hill Creek, east of Long Island:

Ap—0 to 12 inches, dark reddish-brown (5YR 3/4) silt loam, brown (7.5YR 5/4) dry; weak, fine and medium, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium roots; few shale fragments; slightly acid; abrupt, smooth boundary.

B2t—12 to 18 inches, dark reddish-brown (2.5YR 3/4) shaly light silty clay loam, reddish brown (5YR 5/3) dry; moderate, fine and medium, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few medium roots; common thin clay films; about 30 percent shale fragments; medium acid; clear, wavy boundary.

C—18 to 37 inches, reddish-brown (2.5YR 4/4) very shaly silt loam; massive; firm, slightly sticky and slightly plastic; common fine roots; about 40 percent shale fragments; strongly acid; gradual, irregular boundary.

R—37 inches, Triassic shale.

The solum is 16 to 28 inches thick. Shale fragments make up less than 1 percent to about 15 percent of the A horizon, 20 to 35 percent of the Bt horizon, and 35 to 60 percent of the C horizon. Depth to bedrock ranges from value of 3 or 4, and chroma of 2 or 4. The Bt horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 3 or 4. It ranges from shaly light silty clay loam to shaly silt loam and shaly loam. The C horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 3 or 4. It ranges from very shaly silt loam to very shaly loam.

Penn soils are similar to Pinkston soils. They differ from Pinkston soils in having a continuous Bt horizon, and in containing more silt and less sand throughout.

Penn soils are near Mayodan, Pinkston, Roanoke, and White Store soils. They have a thinner solum and contain less clay than Mayodan soils. They are better drained, contain less clay, and are redder than White Store soils.

PeA—Penn silt loam, 0 to 2 percent slopes. This soil is on broad flats of the Triassic lowlands. In places the surface layer is 6 to 10 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas where the soil is less than 20 inches deep over bedrock and scattered small areas where gray mottles are below a depth of 20 inches. Also included were spots of Roanoke and White Store soils.

Runoff is slow on this Penn soil, and the soil is somewhat droughty during the growing season.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIs–1; woodland group 3o2.

PeB—Penn silt loam, 2 to 6 percent slopes. This soil is on broad, slightly convex ridgetops of the Triassic lowlands. It has the profile described as representative of the series. In places, however, the surface layer is 6 to 10 inches thick.

Included with this soil in mapping were scattered small areas of Mayodan, Pinkston, and White Store soils. Also included were scattered small areas where the soil is less than 20 inches deep over bedrock.

Runoff is medium on this Penn soil, and the soil is somewhat droughty during the growing season. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIe–4; woodland group 3o2.

PeC—Penn silt loam, 6 to 15 percent slopes. This soil is on narrow, convex ridgetops and on short side slopes along drainageways. In places the surface layer is 6 to 10 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Mayodan and Pinkston soils. Also included were scattered small areas where the soil is less than 20 inches deep over bedrock.

Runoff is medium to rapid on this Penn soil, and the soil is droughty during the growing season. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the severe erosion hazard. It is better suited to small grain and mixed hay and to drought-resistant pasture grasses and trees. Capability unit IIIe–2; woodland group 3o2.

Pinkston Series

The Pinkston series consists of moderately deep, well-drained to excessively drained, gently sloping to moderately steep soils that have a dominantly loamy subsoil. These soils are on the Piedmont Upland. They formed in material weathered from Triassic sandstone and conglomerate.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies a 7-inch surface layer of dark reddish-brown fine sandy loam. The subsoil is 10 inches of dark-red, very friable fine sandy loam that is interrupted by bodies of dark-red sandy clay loam. The substratum, to a depth of 40 inches, is dark-red, weathered sandstone that crushes to fine sandy loam. Triassic sandstone is at a depth of 40 inches.

Unless limed, Pinkston soils are strongly acid to very strongly acid. They have a low content of organic matter and low natural fertility. Permeability is moderately rapid, and the available water capacity is low.

Representative profile of Pinkston fine sandy loam, 15 to 25 percent slopes, in an area of Pinkston and Penn soils, 15 to 25 percent slopes, in a stand of mixed pine,

one-half mile northeast of junction of State Routes 732 and 635, northwest of Naruna:

O1—2 inches to 1 inch, loose leaves and pine needles.
O2—1 inch to 0, partly decomposed leaves and pine needles.
Ap—0 to 7 inches, dark reddish-brown (5YR 3/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few medium and coarse roots; few weathered sandstone fragments; medium acid; clear, smooth boundary.
B—7 to 17 inches, dark-red (2.5YR 3/6) fine sandy loam; interrupted by irregularly shaped bodies of dark-red (2.5YR 3/6) sandy clay loam; weak, fine, subangular blocky structure; very friable, slightly sticky and slightly plastic; common fine roots; few medium and coarse roots; about 30 percent weathered sandstone fragments; strongly acid; clear, wavy boundary.
C—17 to 40 inches, dark-red (2.5YR 3/6), weathered sandstone that crushes to fine sandy loam; massive; friable; few fine, medium, and coarse roots; few fine flakes of mica; strongly acid.
R—40 inches, Triassic sandstone.

The solum is 12 to 20 inches thick. Sandstone fragments make up about 1 to 15 percent of the A horizon, 20 to 35 percent of the B horizon, and 35 to 60 percent of the C horizon. Depth to bedrock ranges from 20 to 40 inches. The A horizon has hue of 5YR, 2.5YR, or 7.5YR; value of 2 to 4; and chroma of 2 to 4. The B horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 6. It is commonly fine sandy loam, but ranges to loam. Within the B horizon are small irregular bodies of sandy clay loam, loam, or clay loam. The C horizon is commonly dark-red, reddish-brown, or dark reddish-brown sandstone or conglomerate that crushes to fine sandy loam or loam.

Pinkston soils are similar to Louisburg and Penn soils. They are redder throughout than Louisburg soils. They lack the continuous Bt horizon typical of Penn soils and contain more sand and less silt throughout.

Pinkston soils are near Mayodan, Penn, and White Store soils. They lack the continuous Bt horizon typical of Mayodan and White Store soils and contain less clay. Also, they are better drained than White Store soils and are redder throughout.

PkB—Pinkston fine sandy loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. In places the surface layer is 8 to 10 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Mayodan and White Store soils. Also included were small areas where the soil is less than 20 inches deep over bedrock.

Runoff is medium on this Pinkston soil. The soil is somewhat droughty during the growing season. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–2; woodland group 4d1.

PkD—Pinkston fine sandy loam, 6 to 15 percent slopes. This soil is on narrow, convex ridgetops and on short side slopes along drainageways. In places the surface layer is 3 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Mayodan soil. Also included were small areas where the soil is less than 20 inches deep over bedrock and small gullies.

Runoff is medium to rapid on this Pinkston soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, and drought-resistant pasture grasses and trees. Capability unit IVe–2; woodland group 4d1.

PpE—Pinkston and Penn soils, 15 to 25 percent slopes. This mapping unit is on short, convex side slopes. It is about 45 percent Pinkston soil, 40 percent Penn soil, and 15 percent other soils.

Included in this unit in mapping were small areas where the soil is less than 20 inches deep over bedrock, small areas where it is severely eroded, and small areas where the slope is more than 25 percent. Also included were small gullies.

Runoff is rapid, and this mapping unit is droughty during the growing season. Erosion is a very severe hazard in disturbed and exposed areas.

This mapping unit is used mostly as woodland, but small areas are in pasture. The unit is suited to drought-resistant pasture grasses and trees. Capability unit VIe–2; woodland group 4r1.

Quarry, Mine

Quarry, mine is small excavations from which soil material and underlying rock have been removed and adjacent small dumps of waste material. Some of the excavations, which are now mostly abandoned, formerly produced manganese. Others produce crushed rock, mainly marble, for commercial purposes. Quarry, mine is identified by spot symbols on soil maps.

Riverview Series

The Riverview series consists of deep, well-drained, nearly level soils that have a loamy subsoil. These soils formed in alluvium on flood plains along the streams of the survey area.

In a representative profile the surface layer is dark-brown loam 6 inches thick. The subsoil is 58 inches thick. The upper 21 inches is dark yellowish-brown and brown, friable loam; the next 11 inches is dark-brown and brown, friable silt loam; and the lower 26 inches is brown and yellowish-brown, firm silty clay loam.

Unless limed, Riverview soils are strongly acid to medium acid. They have a medium content of organic matter and medium natural fertility. The subsoil is moderately permeable, and the available water capacity is high. The seasonal high water table is at a depth of 3 feet or more, and the soils are frequently flooded.

Representative profile of Riverview loam, about 500

feet southwest of the bridge over Big Otter River on State Route 682, south of Evington:

Ap—0 to 6 inches, dark-brown (10YR 4/3) loam; weak, medium, granular structure; friable, slightly sticky and slightly plastic; many fine roots; common fine flakes of mica; strongly acid; clear, smooth boundary.

B1—6 to 14 inches, dark yellowish-brown (10YR 3/4) loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine flakes of mica; strongly acid; gradual, smooth boundary.

B21—14 to 22 inches, brown (7.5YR 4/4) loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine flakes of mica; medium acid; clear, smooth boundary.

B22—22 to 27 inches, dark yellowish-brown (10YR 3/4) loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine flakes of mica; medium acid; clear, smooth boundary.

Ab—27 to 32 inches, dark-brown (10YR 3/3) silt loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine flakes of mica; medium acid; clear, wavy boundary.

B1b—32 to 38 inches, brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine flakes of mica; medium acid; gradual, wavy boundary.

B2tb—38 to 59 inches, brown (7.5YR 4/4) silty clay loam; few, fine, distinct, red (2.5YR 4/8) mottles; moderate, fine, subangular blocky structure; firm, sticky and slightly plastic; few thin clay films; common fine flakes of mica; medium acid; gradual, wavy boundary.

B3tb—59 to 64 inches, yellowish-brown (10YR 5/4) silty clay loam; weak, fine, subangular blocky structure; firm, slightly sticky and slightly plastic; few thin clay films; common fine flakes of mica; few dark-colored concretions; medium acid.

The solum above the buried soil is 26 to 34 inches thick. Few to many flakes of mica are common throughout the solum. The buried soil is common below a depth of 26 to 34 inches. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. The B horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 4 to 6. It is commonly loam, but ranges to silt loam, fine sandy loam, and silty clay loam. In places it has high-chroma mottles. The buried soil has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 to 6, but in places has mottles of chroma 2 or less. The Ab horizon ranges from silt loam to loam and fine sandy loam. The Btb horizon ranges from silty clay loam to loam, silt loam, and sandy loam.

Riverview soils in this survey area differ from other Riverview soils because they overlie a buried soil, are slightly finer textured in the lower part, and have a higher pH. These differences, however, do not alter their use or management.

Riverview soils are similar to Chewacla and Toccoa soils. They are better drained than Chewacla soils and also differ from those soils in having no gray mottles in the B horizon. They contain more silt and clay than Toccoa soils.

Riverview soils are near Buncombe, Chewacla, State, Toccoa, and Wehadkee soils. They are not so excessively drained as Buncombe soils and contain less sand. They lack the Bt horizon typical of State soils. They are better drained than Wehadkee soils and are not so gray throughout.

Re—Riverview loam. This soil is on flood plains along the larger streams of the survey area. It has the profile described as representative of the series, but in places the surface layer is as much as 10 inches thick. Slopes are dominantly 0 to 2 percent.

Included with this soil in mapping were scattered small areas of Chewacla, State, and Toccoa soils.

Runoff is slow on this Riverview soil. The soil receives runoff from adjacent higher lying areas, is frequently flooded by nearby streams (fig. 4), and has a seasonal high water table at a depth of 3 or more feet.

This soil is used for corn, pasture, and woodland. If adequately protected from flooding, limed, and fertilized, it is suited to most locally grown crops. Capability unit IIw–1; woodland group 1o1.

Roanoke Series

The Roanoke series consists of deep, poorly drained, nearly level soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland, in depressions, at the heads of drainageways, and along drainageways. They formed in local alluvium moved from adjacent higher lying areas.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies a 3-inch surface layer of very dark gray silt loam. The subsoil is 57 inches thick. The upper 30 inches is dark-gray, firm clay mottled with yellowish brown; the next 10 inches is dark-gray and gray, very firm clay mottled with yellowish brown; the next 12 inches is dark grayish-brown, dark-gray, and very dark gray, firm clay mottled with strong brown; and the lower 5 inches is very pale brown, firm clay mottled with light olive brown and gray. Yellowish-red Triassic shale is at a depth of 60 inches.

Unless limed, Roanoke soils have an extremely acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is slowly permeable, and the available water capacity is medium. The seasonal high water table is at the surface or within a depth of 1 foot, and the soils are frequently flooded.

Representative profile of Roanoke silt loam, local alluvium, in a stand of mixed hardwoods, 1.1 mile north of junction of State Routes 637 and 635 and one-tenth mile west of State Route 635, northeast of Long Island:

O1—2 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partly decomposed leaves and twigs.

A1—0 to 3 inches, very dark gray (10YR 3/1) heavy silt loam; few, medium, distinct, yellowish-brown (10YR 5/4) mottles; moderate, fine, granular structure; friable, sticky and slightly plastic; many fine roots; few medium and coarse roots; extremely acid; clear, smooth boundary.

B1tg—3 to 7 inches, dark-gray (10YR 4/1) clay; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, subangular blocky structure; firm, sticky and plastic; common fine roots; few medium and coarse roots; few thin clay films; extremely acid; clear, wavy boundary.

B21tg—7 to 18 inches, dark-gray (10YR 4/1) clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, subangular blocky structure; firm, sticky and plastic; common fine roots; few medium and coarse roots; common thin clay films; few fine subrounded quartz pebbles; extremely acid; gradual, smooth boundary.

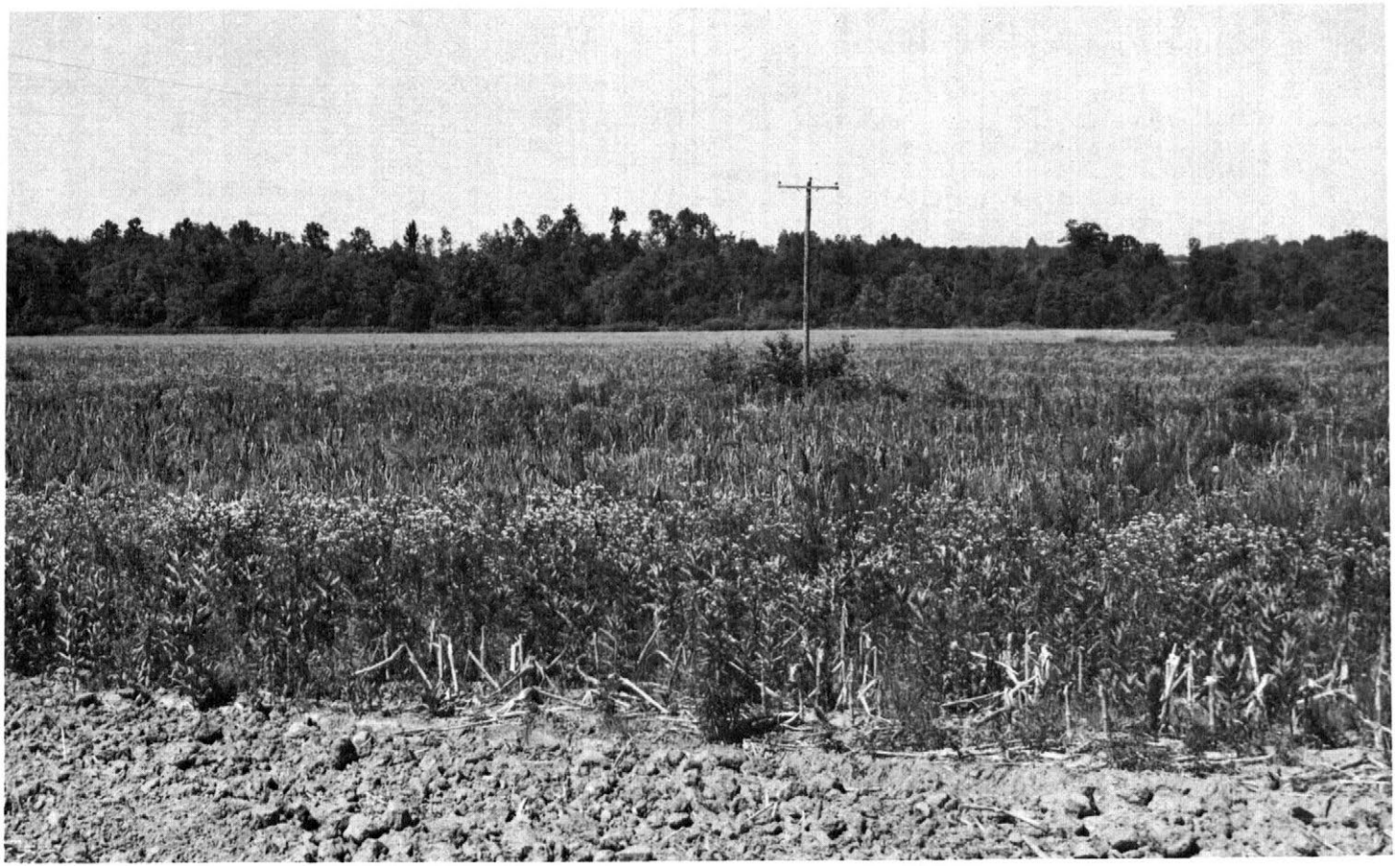


Figure 4.—**Field of corn on Riverview loam. The corn was so severely damaged by floods that it was not harvested. Frequent flooding during the growing season is a hazard on Riverview soils.**

B22tg—18 to 33 inches, dark-gray (N 4/0) clay; common, medium, distinct, yellowish-brown (10YR 5/8) mottles; moderate, fine, angular blocky structure; firm, sticky and very plastic; common fine roots; thin continuous clay films; few subrounded quartz pebbles; extremely acid; gradual, smooth boundary.

B23tg—33 to 43 inches, dark-gray (N 4/0) and gray (10YR 5/1) clay; few, medium, distinct, yellowish-brown (10YR 5/8) mottles; moderate, fine, angular blocky structure; very firm, sticky and very plastic; few fine roots; thin, continuous clay films; few subrounded quartz pebbles; extremely acid; gradual, wavy boundary.

B24tg—43 to 55 inches, dark grayish-brown (10YR 4/2) clay; dark-gray (10YR 4/1) and very dark gray (N 3/0) ped coatings; few, medium, prominent, strong-brown (7.5YR 5/6) mottles; moderate, medium, angular blocky structure; firm, slightly sticky and plastic; moderately thick, continuous clay films; many subrounded quartz pebbles and cobbles; very strongly acid; abrupt, wavy boundary.

IIB25t—55 to 60 inches, very pale brown (10YR 7/3) clay; few, medium, distinct, light olive-brown (2.5Y 5/6) mottles and common, medium, distinct, gray (10YR 5/1) mottles; moderate, fine, subangular blocky structure; firm, sticky and very plastic; few thin clay films; few weathered, yellowish-red shale fragments; very strongly acid.

IIR—60 inches, yellowish-red Triassic shale.

The solum is 40 to 60 inches or more thick. It is less than 1 to about 10 percent subrounded quartz pebbles. In many places a few quartz cobbles are in the lower part of the Bt horizon. Depth to bedrock is 3½ feet or more. The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The A2 horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. In places high-chroma mottles are in the A horizon. The Bt horizon has hue of 10YR, 2.5Y, or N; value of 4 or 5; and chroma of 0 to 2. Yellowish-brown and strong-brown mottles are common. The Bt horizon is commonly clay, but ranges to silty clay, heavy silty clay loam, and heavy clay loam. The IIBt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 6. Bedrock is dark reddish-brown to yellowish-red Triassic shale and sandstone.

Roanoke soils are similar to Elbert, Forestdale, and Worsham soils. They have less than 35 percent base saturation, whereas Elbert and Forestdale soils have more than 35 percent. They contain more silt and less sand than Worsham soils. Clay minerals in Roanoke soils are mixed, whereas in Elbert and Forestdale soils they are montmorillonitic.

Roanoke soils are near Elbert, Mayodan, Penn, and White Store soils. They are more poorly drained than Mayodan, Penn, and White Store soils and are grayer throughout.

Ro—Roanoke silt loam, local alluvium. This soil is in depressions, at the heads of drainageways, and along drainageways throughout the survey area. It has the profile described as representative of the series, but in places the surface layer is 4 to 8 inches thick. Slopes are dominantly 0 to 2 percent.

Included with the soil in mapping were scattered small areas of Elbert, Penn, and White Store soils.

Runoff is slow on this Roanoke soil. The soil receives seepage and runoff from adjacent higher lying areas, is frequently flooded, and has a seasonal high water table at the surface or within a depth of 1 foot.

This soil is used mostly as woodland, but small areas are in pasture. The soil is poorly suited to cultivated crops because of excessive wetness and flooding. Capability unit Vw–1; woodland group 1w2.

Rock Outcrop

Rock outcrop is areas where bedrock and stones are exposed on more than 50 percent of the surface. The rock outcrops and stones are mostly sericite schist, but in small areas are quartz and other rocks. Thickness of soil material among the rock outcrop and stones ranges from a few inches to about 1½ feet. Rock outcrop in this soil survey was mapped only with Manteo soil.

State Series

The State series consists of deep, well-drained, nearly level to gently sloping soils that have a loamy subsoil. These soils formed in alluvium on terraces along streams throughout the survey area.

In a representative profile the surface layer is dark yellowish-brown fine sandy loam 11 inches thick. The subsoil is 41 inches thick. The upper 16 inches is yellowish-brown to brown, friable sandy clay loam; the next 17 inches is brown, friable clay loam; and the lower 8 inches is brown, friable sandy clay loam. The substratum to a depth of 60 inches is yellowish-brown, very friable fine sandy loam.

Unless limed, State soils have a very strongly acid to slightly acid subsoil. They have a low content of organic matter and low natural fertility. Permeability is moderately rapid in the subsoil, and the available water capacity is medium. The seasonal high water table is at a depth of more than 3 feet. Many of these soils are occasionally flooded.

Representative profile of State fine sandy loam, 0 to 2 percent slopes, two-fifths of a mile north of where Little Falling River flows into Falling River, southwest of Hat Creek Village:

Ap—0 to 11 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; few fine roots; few fine subrounded quartz pebbles; few fine flakes of mica; strongly acid; clear, wavy boundary.

B1t—11 to 18 inches, yellowish-brown (10YR 5/4) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine subrounded quartz pebbles; few thin clay films; few fine flakes of mica; strongly acid; gradual, smooth boundary.

B21t—18 to 27 inches, brown (7.5YR 4/4) heavy sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine subrounded quartz pebbles; few thin clay films; few fine flakes of mica; medium acid; gradual, smooth boundary.

B22t—27 to 44 inches, brown (7.5YR 4/4) clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine subrounded quartz pebbles; few thin clay films; few fine flakes of mica; medium acid; gradual, wavy boundary.

B3t—44 to 52 inches, brown (7.5YR 4/4) sandy clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine subrounded quartz pebbles; few thin clay films; few fine flakes of mica; medium acid; gradual, wavy boundary.

C—52 to 60 inches, yellowish-brown (10YR 5/8) fine sandy loam; massive; very friable; few fine flakes of mica; many fine subrounded quartz pebbles; medium acid.

The solum is about 30 to 60 inches thick. It is less than 1 to about 10 percent fine, subrounded quartz pebbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is commonly sandy clay loam or clay loam, but ranges to heavy loam. The C horizon ranges from fine sandy loam to loam and loamy sand and has some pebbles and cobbles.

State soils are similar to Abell, Masada, Riverview, and Toccoa soils. They differ from Abell soils in having no mottles of chroma 2 or less in the upper 24 inches of the Bt horizon. They have less clay in the Bt horizon than Masada soils. They have a Bt horizon, which Riverview and Toccoa soils lack.

State soils are near Augusta, Buncombe, Chewacla, Dogue, Masada, Riverview, Toccoa, and Wahee soils. They are better drained than Augusta, Chewacla, and Dogue, and Wahee soils. They contain more silt and clay and less sand than Buncombe soils.

StA—State fine sandy loam, 0 to 2 percent slopes. This soil is on low terraces along the larger streams of the survey area. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Buncombe, Dogue, Masada, and Riverview soils. Also included were spots where gray mottles are 20 to 30 inches below the surface and some areas of a State soil that has as much as 8 inches of overwash on the surface.

Runoff is slow. The seasonal high water table is at a depth of more than 3 feet, and many areas are occasionally flooded.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. If protected from flooding and adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIw–1; woodland group 1o1.

StB—State fine sandy loam, 2 to 6 percent slopes. This soil is on low terraces along the larger streams of the survey area.

Included with this soil in mapping were small scattered areas of Buncombe, Dogue, Masada, Riverview, and Toccoa soils. Also included were some areas of a State soil that has as much as 8 inches of overwash on the surface.

Runoff is medium. The seasonal high water table is at a depth of more than 3 feet, and many areas of the soil are occasionally flooded. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. If protected from flooding and

adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 1o1.

Tallapoosa Series

The Tallapoosa series consists of moderately deep to deep, well-drained, sloping to steep soils that have a loamy subsoil. These soils are on the Piedmont Upland. They formed in material weathered from quartz mica schist.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies a 6-inch surface layer of loam. The upper part is dark brown, and the lower part is brown. The subsoil is 11 inches thick. The upper 4 inches is reddish-brown loam, and the lower 7 inches is yellowish-red clay loam. The substratum, to a depth of 30 inches, is strongly weathered quartz mica schist that crushes to loam. Weathered quartz mica schist is at a depth of 30 inches.

Tallapoosa soils are strongly acid to very strongly acid. They have a low content of organic matter and low natural fertility. They are moderately permeable, and the available water capacity is low.

Representative profile of Tallapoosa loam, 15 to 25 percent slopes, in a stand of mixed hardwoods and pine, one-fifth mile northwest of junction of State Routes 700 and 705, west of Marysville:

O1—2 inches to 1 inch, fresh forest litter.
O2—1 inch to 0, partly decomposed forest litter; many fine and medium roots.
A1—0 to 1 inch, dark-brown (10YR 3/3) loam; weak, fine, granular structure; very friable; many fine and medium roots; common fine flakes of mica; medium acid; abrupt, smooth boundary.
A2—1 inch to 6 inches, brown (7.5YR 4/4) loam; weak, medium, granular structure; very friable, slightly sticky; few fine and medium roots; common fine flakes of mica; common quartz pebbles; strongly acid; clear, wavy boundary.
B1—6 to 10 inches, reddish-brown (5YR 4/4) loam; weak, medium, subangular blocky structure; friable, slightly sticky; few fine roots; common fine flakes of mica; common quartz pebbles and schist fragments; strongly acid; clear, smooth boundary.
B2t—10 to 17 inches, yellowish-red (5YR 4/8) clay loam; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few thin clay films; common fine flakes of mica; many quartz pebbles and schist fragments; very strongly acid; clear, irregular boundary.
C—17 to 30 inches, mixed yellowish-red (5YR 4/6) and reddish-brown (5YR 4/4), strongly weathered quartz mica schist that is coated with translocated clayey material and crushes to loamy material; rock-controlled structure; many fine and medium flakes of mica; strongly acid; gradual, irregular boundary.
R—30 inches, weathered quartz mica schist.

The solum is 7 to 20 inches thick. It is 2 to 15 percent angular quartz pebbles and schist fragments. Depth to bedrock ranges from 20 to 60 inches. The A horizon has hue of 10YR, 7.5YR, or 5YR; value of 3 to 5; and chroma of 3 to 6. The Bt horizon has hue of 5YR, 7.5YR, or 2.5YR; value of 4 to 6; and chroma of 4 to 8. It is commonly clay loam or loam. In places tongues of the Bt horizon extend into the underlying horizons to a depth of about 3 feet. The C horizon has hue of 10YR or redder and value and chroma of 4 or more.

Tallapoosa soils are similar to Louisburg, Manteo, and Wilkes soils. They have a continuous Bt horizon, which Louisburg and Manteo soils lack. They are deeper over bedrock than Manteo soils. They are redder than Wilkes soils. Also, they have less than 35 percent base saturation, whereas Wilkes soils have more than 35 percent.

Tallapoosa soils are near Appling, Cecil, Louisburg, Madison, Manteo, and Wilkes soils. They have a thinner solum and contain less clay than Appling, Cecil, and Madison soils.

TaD—Tallapoosa loam, 6 to 15 percent slopes. This soil is on narrow, winding, convex ridgetops and on complex side slopes. In places the surface layer is 2 to 4 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Louisburg, Madison, Manteo, and Wilkes soils. Also included were small areas where the soil is less than 20 inches deep over bedrock.

Runoff is medium to rapid on this Tallapoosa soil. This soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, pasture, and woodland. Capability unit IVe–2; woodland group 4o1.

TaE—Tallapoosa loam, 15 to 25 percent slopes. This soil is on short, convex side slopes along drainageways. It has the profile described as representative of the series, but in places the surface layer is 2 to 4 inches thick.

Included with this soil in mapping were scattered small areas of Appling, Louisburg, Madison, Manteo, and Wilkes soils. Also included were small areas where the soil is less than 20 inches deep over bedrock.

Runoff is rapid on this Tallapoosa soil. The soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is used mostly as woodland. It is suited to drought-resistant pasture grasses and trees. Capability unit VIe–2; woodland group 4r1.

TaF—Tallapoosa loam, 25 to 60 percent slopes. This soil is on short, convex side slopes along drainageways. In places the surface layer is 2 to 4 inches thick, but the profile otherwise is similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Louisburg, Manteo, and Wilkes soils. Also included were small areas where the soil is less than 20 inches deep over bedrock and small areas where the slope is more than 60 percent.

Runoff is rapid on this Tallapoosa soil. The soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is used mostly as woodland. Capability unit VIIe–1; woodland group 4r1.

Tatum Series

The Tatum series consists of deep, well-drained, gently sloping to moderately steep soils that have a

dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from quartz sericite schist.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies an 8-inch surface layer of loam. The upper part is dark grayish brown, and the lower part is strong brown. The subsoil is 28 inches thick. The upper 4 inches is yellowish-red, friable clay loam; the next 17 inches is red, friable clay; and the lower 7 inches is red, friable silt loam. The substratum, to a depth of 50 inches, is weathered quartz sericite schist that crushes to silt loam. Quartz sericite schist is at a depth of 50 inches.

Unless limed, Tatum soils have a very strongly acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Tatum loam, 2 to 6 percent slopes, in a mixed stand of hardwoods, six-tenths of a mile south of junction of State Routes 615 and 646, south of Mike:

O1—2 inches to 1 inch, loose leaves and twigs.
O2—1 inch to 0, partly decomposed leaves and twigs.
A1—0 to 1 inch, dark grayish-brown (10YR 4/2) loam; weak, fine, granular structure; very friable; many fine and medium roots; few coarse roots; very strongly acid; abrupt, smooth boundary.
A2—1 inch to 8 inches, strong-brown (7.5YR 5/6) loam; weak, fine, granular structure; friable; many fine and medium roots; few coarse roots; very strongly acid; clear, smooth boundary.
B1t—8 to 12 inches, yellowish-red (5YR 5/6) clay loam; weak, fine and medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few thin clay films; very strongly acid; abrupt, smooth boundary.
B2t—12 to 29 inches, red (2.5YR 4/8) clay; moderate, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common thin clay films; few weathered schist fragments; very strongly acid; gradual, wavy boundary.
B3t—29 to 36 inches, red (2.5YR 5/8) heavy silt loam; weak, fine, subangular blocky structure; friable; few fine roots; few thin clay films; 25 to 30 percent strongly weathered quartz sericite schist; very strongly acid; clear, wavy boundary.
C—36 to 50 inches, reddish-brown (2.5YR 5/4) and light yellowish-brown (10YR 6/4), weathered quartz sericite schist that crushes to silt loam; massive; firm; thin reddish clay flows in seams; very strongly acid.
R—50 inches, quartz sericite schist.

The solum is 25 to 45 inches thick. It is less than 1 to about 15 percent angular quartz pebbles. Schist fragments make up 5 to 30 percent of the lower part of the Bt horizon. Depth to bedrock ranges from 3½ to 5 feet. In most places the A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. Where the soil is severely eroded, however, hue ranges to 5YR or 2.5YR and chroma is 4 to 6. The A horizon is commonly loam, but is clay loam where the soil is severely eroded. The B2t horizon has hue of 2.5YR or 10YR, value of 4 or 5, and chroma of 6 to 8. It is clay, silty clay, heavy clay loam, or heavy silty clay loam. The C horizon is multicolored strongly weathered schist that crushes to loam.

Tatum soils are similar to Cecil, Cullen, Georgeville, and Madison soils. They lack the dark-red Bt subhorizon typical of Cullen soils. Clay minerals in Tatum soils are mixed, whereas in Cecil, Georgeville, and Madison soils they are kaolinitic.

Tatum soils are near Abell, Cecil, Cullen, Georgeville, Herndon, Manteo, and Nason soils. They are better drained than Abell soils and also differ from those soils in having no low-chroma mottles in the upper 24 inches of the Bt horizon. They are redder than Herndon and Nason soils. They contain more clay than Manteo soils and have a thicker solum.

TlB—Tatum loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the series, but where moderately eroded, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Cecil, Cullen, Georgeville, Herndon, Manteo, and Nason soils.

Runoff is medium on this Tatum soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, dark tobacco, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops (fig. 5). Capability unit IIe–2; woodland group 3o1.

TlC2—Tatum loam, 6 to 15 percent slopes, eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. The surface layer is 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cecil, Cullen, Georgeville, Herndon, Manteo, and Nason soils.

Runoff is medium to rapid on this Tatum soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

Figure 5.—**An area of Tatum loam, 2 to 6 percent slopes, and Tatum loam, 6 to 15 percent slopes, eroded, used for farming and urban development.**

This soil is used for corn, small grain, mixed hay, dark tobacco, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–2; woodland group 3o1.

TlE2—Tatum loam, 15 to 25 percent slopes, eroded. This soil is on short, convex side slopes along drainageways. The surface layer is 4 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Cecil, Cullen, Georgeville, Manteo, and Nason soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is rapid on this Tatum soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used mostly as woodland. It is poorly suited to cultivated crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, pasture, and woodland. Capability unit IVe–1; woodland group 3r1.

TmD3—Tatum clay loam, 6 to 15 percent slopes, severely eroded. This soil is on narrow, winding, convex ridgetops and on complex side slopes. The surface layer is mostly subsoil material, but the profile is otherwise similar to the one described as representative of the series. In places, however, the surface layer is silty clay loam.

Included with this soil in mapping were scattered small areas of Cecil, Cullen, Manteo, and Nason soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is medium to rapid on this Tatum soil. Further erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled. The surface layer is sticky when wet and hard when dry. If worked when too wet, the soil becomes puddled and plowshares do not scour. If worked when too dry, the soil breaks up in clods that are difficult to work down into a seedbed.

This soil is used for mixed hay, pasture, and woodland. It is poorly suited to cultivated crops because of the very severe erosion hazard, the slope, and the clay loam surface layer. It is better suited to mixed hay, pasture, and woodland. Capability unit IVe–3; woodland group 4c1.

TmE3—Tatum clay loam, 15 to 25 percent slopes, severely eroded. This soil is on short, convex side slopes along drainageways. The surface layer is mostly subsoil material, but the profile is otherwise similar to the one described as representative of the series. In places the surface layer is silty clay loam.

Included with this soil in mapping were scattered small areas of Cecil, Cullen, Manteo, and Nason soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is rapid on this Tatum soil, and the soil is somewhat droughty during the growing season. Further erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is commonly used as woodland. It is best suited to pasture and woodland. Capability unit VIe–1; woodland group 4c2.

Toccoa Series

The Toccoa series consists of deep, well-drained, nearly level soils that have a loamy substratum. These soils formed in alluvium on flood plains along the streams of the survey area.

In a representative profile the surface layer is dark-brown fine sandy loam 11 inches thick. The substratum to a depth of 64 inches or more is brown and dark grayish-brown, very friable fine sandy loam.

Unless limed, Toccoa soils are slightly acid to medium acid. They have a low content of organic matter and low natural fertility. Permeability is moderately rapid in the substratum, and the available water capacity is medium. The seasonal high water table is at a depth of 3 feet or more, and the soils are frequently flooded.

Representative profile of Toccoa fine sandy loam, 300 feet north of Staunton River and about one-third mile southwest of Norfolk and Western Railroad tressel over Falling River, southeast of Brookneal:

Ap—0 to 11 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; many fine flakes of mica; slightly acid; abrupt, smooth boundary.

C1—11 to 15 inches, brown (7.5YR 4/4) fine sandy loam; massive; very friable; many fine roots; ¼-inch worm channels; many fine flakes of mica; few thin bedding planes of loamy sand; slightly acid; clear, smooth boundary.

C2—15 to 23 inches, brown (10YR 4/3) fine sandy loam; massive; very friable; common fine roots; many fine flakes of mica; thin bedding planes of loamy sand; slightly acid; clear, smooth boundary.

Ab—23 to 37 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; common fine roots; many fine flakes of mica; slightly acid; gradual, smooth boundary.

C3—37 to 48 inches, brown (10YR 4/3) fine sandy loam; massive; very friable; few fine roots; many fine flakes of mica; few thin bedding planes of loamy sand; slightly acid; gradual, smooth boundary.

C4—48 to 64 inches, brown (10YR 4/3) fine sandy loam; lenses of loamy fine sand; massive; very friable; few fine roots; many fine flakes of mica; slightly acid.

Subrounded quartz pebbles make up from 1 to 10 percent of the A horizon and 5 to 15 percent of the C horizon. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 2 to 4. The C horizon has hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 2 to 6. It is commonly fine sandy loam and has bedding planes and lenses of loamy sand, loamy fine sand, or loam. In places loamy sand and sand and gravel are below a depth of about 40 inches.

Toccoa soils are similar to Buncombe and Riverview soils. They are not so sandy as Buncombe soils. They contain less silt and clay than Riverview soils and lack the B horizon typical of those soils.

Toccoa soils are near Buncombe, Chewacla, Riverview, State, and Wehadkee soils. They are better drained than Chewacla and Wehadkee soils. They lack the Bt horizon typical of State soils.

To—Toccoa fine sandy loam. This soil is on flood plains along the larger drainageways and streams

throughout the survey area. Slopes are dominantly 0 to 2 percent.

Included with this soil in mapping were scattered small areas of Buncombe, Chewacla, Riverview, and State soils. Also included were small areas near the larger streams where the slope is more than 2 percent.

Runoff is slow on this Toccoa soil. The soil is frequently flooded by nearby streams.

This soil is used mostly for corn, pasture, and woodland. If protected from flooding and adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIw–1; woodland group 1o1.

Turbeville Series

The Turbeville series consists of deep, well-drained, gently sloping to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in the older alluvium commonly higher than, and some distance from, present flood plains.

In a representative profile about 3 inches of partly decomposed forest litter overlies a 10-inch surface layer of fine sandy loam. The upper 2 inches is brown to dark brown, and the lower 8 inches is yellowish brown. The subsoil is 62 inches or more thick. The upper 3 inches is strong-brown, firm clay loam; the next 13 inches is red, firm clay; and the lower 46 inches is dark-red, firm clay.

Unless limed, Turbeville soils have a very strongly acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Representative profile of Turbeville fine sandy loam, 2 to 6 percent slopes, in a stand of small pine and hardwoods, 150 yards east of U.S. Highway 501 and one-half mile north of Opossum Creek:

O1&O2—3 inches to 0, partly decomposed loose leaves and twigs underlain by very dark brown organic material.

A1—0 to 2 inches, brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine and medium roots; common fine pores; very strongly acid; abrupt, smooth boundary.

A2—2 to 10 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; friable, slightly sticky; many fine and few medium roots; common fine and medium pores; very strongly acid; clear, smooth boundary.

B21t—10 to 13 inches, strong-brown (7.5YR 5/6) clay loam, reddish yellow (7.5YR 6/6) dry; weak, fine and medium, subangular blocky structure; slightly hard, slightly firm, slightly sticky and slightly plastic; few fine and medium roots; common fine pores; thin patchy clay films; few rounded quartz pebbles; very strongly acid; clear, smooth boundary.

B22t—13 to 26 inches, red (2.5YR 4/6) clay, light red (2.5YR 6/6) dry; moderate, fine and medium, subangular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; common fine and medium pores; thin, continuous clay films; few rounded quartz pebbles; very strongly acid; gradual, smooth boundary.

B23t—36 to 48 inches, dark-red (2.5YR 3/6) clay; strong, fine and medium, subangular blocky structure; hard, firm, sticky and plastic; few fine and medium roots; common fine pores; thin, continuous clay films; few rounded quartz pebbles; very strongly acid; gradual, smooth boundary.

B24t—48 to 72 inches, dark-red (10YR 3/6) clay; moderate, medium, subangular and angular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine pores; thin, continuous clay films; few rounded quartz pebbles; common flakes of mica; black and brown minerals in fine and very fine sand fraction; very strongly acid.

The solum is more than 60 inches thick. Rounded quartz pebbles and a few cobbles make up about 2 to 15 percent of the solum. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The B21t horizon has hue of 7.5YR, 5YR, or 2.5YR; value of 4 or 5; and chroma of 4 to 6. It is clay loam or sandy clay loam. The Bt horizon below the B21t horizon has hue of 2.5YR or 10R, value of 4 in the upper part and 3 in the lower part, and chroma of 4 to 8. It is commonly clay, but ranges to heavy clay loam.

Turbeville soils are similar to Cecil, Cullen, Hiwassee, Masada, and Tatum soils. They have a thicker solum than Cullen and Tatum soils and have a redder B horizon than Masada soils. Clay minerals in Turbeville soils are mixed, whereas in Hiwassee soils they are kaolinitic.

Turbeville soils are near Cecil, Hiwassee, Masada, and Tatum soils.

TuB—Turbeville fine sandy loam, 2 to 6 percent slopes. This soil is on broad, slightly convex ridgetops of high terraces along the larger streams of the survey area. It has the profile described as representative of the series. Where moderately eroded, however, the surface layer is only 6 to 8 inches thick.

Included with this soil in mapping were scattered small areas of Hiwassee, Masada, and Tatum soils. Also included were small areas where the slope is less than 2 percent and spots where the subsoil is mottled at a depth of about 35 inches.

Runoff is medium on this Turbeville soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–1; woodland group 3o1.

TuC2—Turbeville fine sandy loam, 6 to 15 percent slopes, eroded. This soil is on narrow side slopes and at the breaks of high-lying terraces along the larger streams of the survey area. The surface layer is 4 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Masada and Tatum soils. Also included were small areas where the slope is more than 15 percent and spots where the subsoil is mottled at a depth of about 35 inches.

Runoff is medium to rapid on this Turbeville soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–1; woodland group 3o1.

Urban Land

UL—Urban land is altered, reworked, or removed soil material. Commercial, industrial, and residential

developments cover much of the surface. Areas were disturbed during the construction of foundations, basements, streets, pipelines, parking lots, and other structures.

Much of the soil material was originally Cecil, Cullen, Enon, Fluvanna, Georgeville, Madison, Tallapoosa, and Wilkes soils. The characteristics and properties of these soils have been changed by urban use. Slopes are commonly about 2 to 15 percent, but range to as much as 25 percent in a few spots. Not assigned to a capability unit or woodland group.

UNC—Urban land-Cecil complex, sloping. This mapping unit is about 50 percent Urban land and dominantly 50 percent Cecil soil. Slopes commonly range from about 2 to 15 percent.

Included in this unit in mapping were scattered small areas of Cullen, Madison, Tallapoosa, and Wilkes soils. Also included were small areas where the slope is more than 15 percent. Not assigned to a capability unit or woodland group.

URC—Urban land-Cullen complex, sloping. This mapping unit is about 50 percent Urban land and dominantly 50 percent Cullen soil. Slopes commonly range from about 2 to 15 percent.

Included in this unit in mapping were scattered small areas of Georgeville, Fluvanna, Madison, Mecklenburg, Tatum, and Wilkes soils. Also included were small areas where the slope is more than 15 percent. Not assigned to a capability unit or woodland group.

USC—Urban land-Madison complex, sloping. This mapping unit is about 50 percent Urban land and dominantly 50 percent Madison soil. Bedrock is commonly at a depth of 60 inches or more in the Madison soil, but the profile is otherwise similar to the one described as representative of the Madison series. Slopes commonly range from about 2 to 15 percent.

Included in this unit in mapping were scattered small areas of Cecil, Cullen, Enon, Fluvanna, Tallapoosa, and Wilkes soils. Also included were small areas where the slope is more than 15 percent. Not assigned to a capability unit or woodland group.

Vance Series

The Vance series consists of deep, well-drained, gently sloping to sloping soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from granite gneiss, quartz mica schist, and micaceous quartzite.

In a representative profile the surface layer is brown fine sandy loam 7 inches thick. The subsoil is 36 inches thick. The upper 3 inches is yellowish-brown, friable clay loam; the next 14 inches is yellowish-brown, very firm clay mottled with red and olive in the lower part; and the lower 19 inches is mottled red, yellowish-brown, and light brownish-gray, friable clay loam. The substratum to a depth of 60 inches is weathered granite gneiss that crushes easily to loam.

Unless limed, Vance soils have a very strongly acid to strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is slowly permeable, and the available water capacity is medium.

Representative profile of Vance fine sandy loam, 2 to 6 percent slopes, one-quarter mile north of U.S. Highway 40 and 50 yards west of State Route 600, northeast of Brookneal:

Ap—0 to 7 inches, brown (10YR 5/3) fine sandy loam; weak, medium, granular structure; very friable; many fine roots; few angular quartz pebbles; strongly acid; abrupt, smooth boundary.

B1t—7 to 10 inches, yellowish-brown (10YR 5/6) clay loam; weak, fine, subangular blocky structure; friable, slightly sticky and plastic; many fine roots; few thin clay films; few angular quartz pebbles; very strongly acid; clear, smooth boundary.

B21t—10 to 17 inches, yellowish-brown (10YR 5/6) clay; moderate, medium, subangular blocky structure; very firm, sticky and plastic; common fine roots; thin, continuous clay films; few quartz pebbles; very strongly acid; clear, smooth boundary.

B22t—17 to 24 inches, yellowish-brown (10YR 5/4) clay; few, fine, distinct, red (2.5YR 4/8) and olive (5Y 5/3) mottles; moderate, fine and medium, subangular blocky structure; very firm, sticky and plastic; few fine roots; thin, continuous clay films; very strongly acid; clear, wavy boundary.

B3t—24 to 43 inches, mottled red (2.5YR 4/8), yellowish-brown (10YR 5/4), and light brownish-gray (10YR 6/2) heavy clay loam; moderate, medium, subangular blocky structure; friable, sticky and plastic; few fine roots; few thin clay films; common weathered granite gneiss fragments; very strongly acid; gradual, irregular boundary.

C—43 to 60 inches, mixed light-gray (10YR 7/2) and yellowish-brown (10YR 5/8) weathered granite gneiss that crushes easily to loam; massive; friable; slightly sticky and slightly plastic; few thin yellowish red clay flows in seams; very strongly acid.

The solum is 25 to 50 inches thick. It is less than 1 to 5 percent angular quartz pebbles. Depth to bedrock is 4 feet or more. The A horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2 to 4. The Bt horizon has hue of 10YR, 7.5YR, or 5YR; value of 4 or 5; and chroma of 4 to 8. In many places the lower part of the B2t horizon is mottled with red and olive. The B3t horizon is commonly mottled in red, yellowish brown, and light brownish gray. It is commonly heavy clay loam, but ranges to clay and sandy clay. The C horizon is weathered granite gneiss, quartz mica schist, or micaceous quartzite that crushes to loam, clay loam, or sandy clay loam.

Vance soils are similar to Appling, Enon, Fluvanna, Helena, Herndon, and Mayodan soils. They have less than 35 percent base saturation, whereas Enon soils have more than 35 percent base saturation. They have a yellower solum than Fluvanna soils and also differ from those soils in having a very firm B2t horizon. They are better drained than Helena soils and also differ from those soils in having no mottles of chroma or less in the upper 24 inches of the Bt horizon. Clay minerals in Vance soils are mixed, whereas in Appling, Herndon, and Mayodan soils they are kaolinitic.

Vance soils are near Abell, Appling, Cecil, Enon, Fluvanna, Helena, Louisburg, and Worsham soils. They are better drained than Abell soils, and contain more clay than Abell and Louisburg soils. They are not so red as Cecil soils. They are better drained than Worsham soils and are not so gray.

VaB—Vance fine sandy loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. It has the profile described as representative of the series.

Included with this soil in mapping were scattered small areas of Appling, Enon, Fluvanna, and Helena soils.

Runoff is medium on this Vance soil. Erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, and pasture. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–2; woodland group 3o1.

VaB2—Vance fine sandy loam, 2 to 6 percent slopes, eroded. This soil is on broad, convex ridgetops. The surface layer is 3 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series. Where more severely eroded, however, the surface layer is sandy clay loam.

Included with this soil in mapping were scattered small areas of Appling, Enon, Fluvanna, and Helena soils.

Runoff is medium on this Vance soil. Further erosion is a moderate hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is suited to most locally grown crops. Capability unit IIe–2; woodland group 3o1.

VaC2—Vance fine sandy loam, 6 to 10 percent slopes, eroded. This soil is on narrow, convex ridgetops and on short side slopes. The surface layer is 3 to 6 inches thick, but the profile is otherwise similar to the one described as representative of the series. Where more severely eroded, however, the surface layer is sandy clay loam.

Included with this soil in mapping were scattered small areas of Appling, Enon, Fluvanna, and Helena soils. Also included were small areas where the slope is more than 10 percent.

Runoff is medium on this Vance soil. Further erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, tobacco, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–4; woodland group 3o1.

Wahee Series

The Wahee series consists of deep, somewhat poorly drained, nearly level soils that have a dominantly clayey subsoil. These soils formed in alluvium on low terraces along streams throughout the survey area.

In a representative profile the surface layer is dark grayish-brown loam 9 inches thick. The subsoil is 37 inches thick. The upper 9 inches is yellowish-brown, light yellowish-brown, and light-gray, firm clay; the next 9 inches is light-gray, firm clay mottled with strong brown; and the lower 19 inches is light-gray and strong-brown, friable sandy clay loam. The substratum to a depth of 60 inches is light-gray gravelly sand.

Unless limed, Wahee soils are very strongly acid to strongly acid. They have a low content of organic matter and low natural fertility. The subsoil is slowly permeable, and the available water capacity is medium. The seasonal high water table is at a depth of 1 to 1½ feet, and the soils are frequently flooded.

Wahee soils in this survey area were mapped only with Augusta soils.

Representative profile of Wahee loam, in an area of Wahee and Augusta loams, one-tenth mile west and 1.2 miles south of junction of State Routes 663 and 651, east of Rustburg:

Ap—0 to 9 inches, dark grayish-brown (2.5Y 4/2) loam; weak, fine, granular structure; very friable, slightly sticky and slightly plastic; many fine roots; few rounded quartz pebbles; slightly acid; abrupt, smooth boundary.

B21t—9 to 18 inches, mottled yellowish-brown (10YR 5/8), light yellowish-brown (10YR 6/4), and light-gray (N 7/0) clay; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; strongly acid; clear, smooth boundary.

B22tg—18 to 27 inches, light-gray (N 7/0) clay; many, medium, distinct, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; strongly acid; clear, wavy boundary.

B3tg—27 to 46 inches, mottled light-gray (N 6/0) and strong-brown (7.5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few thin clay films; strongly acid; clear, irregular boundary.

Cg—46 to 60 inches, light-gray (N 6/0) gravelly sand; loose; few quartz cobbles; strongly acid.

The solum is 30 to 60 inches thick. Depth to bedrock is more than 5 feet. The A horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 or 2. The upper part of the B2t horizon is commonly mottled in yellowish brown, light yellowish brown, strong brown, and light olive brown and has hue of 10YR, 7.5YR, or 2.5Y; value of 4 to 6; and chroma of 4 to 8; or is light gray or gray and has hue of 10YR or N, value of 5 to 7, and chroma of 0 to 1. The lower part of the B2t horizon is commonly light gray or gray; has hue of 10YR or N, value of 5 to 7, and chroma of 0 and 1; and has high-chroma mottles. The B2t horizon is commonly clay, but ranges to heavy clay loam, heavy silty clay loam, and silty clay. The B3t horizon is commonly light gray or gray or is mottled in light gray, gray, strong brown, yellowish brown, or light olive brown. It ranges from fine sandy loam and sandy clay loam to clay. The C horizon ranges from sand and gravelly sand to loam and silt loam.

Wahee soils in this survey area have a solum that is thinner than is described as the range for the series. This difference, however, does not alter their use or management.

Wahee soils are similar to Augusta, Elbert, Forestdale, Roanoke, and Worsham soils. They have more clay than Augusta soils. They are not so poorly drained and not so gray as Elbert, Forestdale, Roanoke, and Worsham soils.

Wahee soils are near Augusta, Chewacla, Dogue, Forestdale, State, and Wehadkee soils. They have more clay than Chewacla, State, and Wehadkee soils. They are more poorly drained than State soils and not so poorly drained as Wehadkee soils. They are more poorly drained than Dogue soils and are grayer in the upper part of the Bt horizon.

Wa—Wahee and Augusta loams. This mapping unit is in slightly depressed areas on low terraces or on flood plains and along the larger drainageways and streams throughout the survey area. It is about 45 percent Wahee loam and 35 percent Augusta loam. Slopes are dominantly 0 to 2 percent.

Included in this unit in mapping were scattered small areas of Chewacla, Forestdale, Dogue, and We-

hadkee soils. Also included were spots of a gravelly soil.

Runoff is slow on this mapping unit. The unit receives seepage and runoff from adjacent higher lying areas, is frequently flooded by nearby streams, and has a seasonal high water table at a depth of 1 foot to 1½ feet. Drainage is desirable if the unit is used for farming.

This mapping unit is used for corn, small grain, mixed hay, pasture, and woodland. If adequately drained, protected from flooding, limed, and fertilized, it is moderately well suited to most locally grown crops. Alfalfa is short lived because of excessive wetness and flooding. Capability unit IIIw–2; woodland group 2w1.

Wedowee Series

The Wedowee series consists of deep, well-drained, moderately steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from granite, granite gneiss, quartz mica schist, and micaceous quartzite.

In a representative profile about 1 inch of undecomposed and partly decomposed forest litter overlies a 6-inch surface layer of yellowish-brown fine sandy loam. The subsoil is 21 inches thick. It is strong-brown, friable to firm clay loam and clay. The substratum to a depth of 60 inches is strongly weathered granite gneiss that crushes to loam.

Unless limed, Wedowee soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is moderately permeable, and the available water capacity is medium.

Wedowee soils in this survey area were mapped only with Appling soils.

Representative profile of Wedowee fine sandy loam, 15 to 25 percent slopes, eroded, in an area of Appling-Wedowee fine sandy loams, 15 to 25 percent slopes, eroded, in a stand of pine, one-half mile northeast of junction of State Routes 601 and 720, 400 feet east of State Route 601, north of Brookneal:

O1—1 inch to 0, undecomposed and partly decomposed pine needles and twigs.

Ap—0 to 6 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; friable; many fine roots; few medium and coarse roots; few angular quartz pebbles; very strongly acid; clear, smooth boundary.

B1t—6 to 10 inches, strong-brown (7.5YR 5/6) clay loam; moderate, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; few thin clay films; very strongly acid; clear, smooth boundary.

B2t—10 to 18 inches, strong-brown (7.5YR 5/6) clay; moderate, medium, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common thin clay films; very strongly acid; gradual, smooth boundary.

B3t—18 to 27 inches, strong-brown (7.5YR 5/6) clay; moderate, medium, subangular blocky structure; firm, slightly sticky and slightly plastic; common moderately thick clay films; strongly weathered granite gneiss makes up about 40 percent of horizon; very strongly acid; gradual, wavy boundary.

C—27 to 60 inches, very pale brown (10YR 7/4) and reddish-yellow (7.5YR 6/8), strongly weathered granite gneiss that crushes to loam; massive; friable; very strongly acid.

The solum is 20 to 40 inches thick. In many places it is about 2 to 25 percent angular quartz pebbles. Depth to bedrock is 4 feet or more. The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 6. The Bt horizon has hue of 7.5YR, 10YR, or 5YR; value of 5 and 6; and chroma of 6 to 8. The B1t horizon is clay loam, sandy clay loam, or gravelly sandy clay loam. The B2t horizon is commonly clay, but ranges to heavy clay loam. The B3t horizon ranges from clay to clay loam and sandy clay loam. The C horizon is commonly strongly weathered granite, granite gneiss, quartz mica schist, or micaceous quartzite that crushes to loam or sandy loam.

Wedowee soils are similar to Appling, Cecil, Herndon, Mayodan, and Nason soils. They have a thinner solum than Appling, Cecil, and Herndon soils and are not so red as Cecil soils. They have less exchangeable aluminum in the Bt horizon than Mayodan soils. They have more sand and less silt than Nason soils.

Wedowee soils are near Appling, Cecil, and Louisburg soils. They have more clay than Louisburg soils and also differ from those soils in having a continuous Bt horizon.

Wehadkee Series

The Wehadkee series consists of deep, poorly drained, nearly level soils that have a loamy subsoil. These soils formed in alluvium on flood plains along the streams of the survey area.

In a representative profile the surface layer is dark grayish-brown loam 5 inches thick. The subsoil is 32 inches thick. The upper 10 inches is olive-gray, friable loam mottled with dark yellowish brown; the next 16 inches is olive-gray and gray, friable to firm heavy loam and light clay loam mottled with yellowish brown, light olive brown, and yellowish red; and the lower 6 inches is dark-gray, friable light clay loam mottled with brown and olive brown. The substratum to a depth of 60 inches is mottled dark-gray and dark grayish-brown very gravelly loam.

Wehadkee soils are medium acid to slightly acid. They have a medium content of organic matter and medium natural fertility. The subsoil is moderately permeable, and the available water capacity is high. The seasonal high water table is at the surface or within a depth of 1 foot, and the soils are frequently flooded.

Representative profile of Wehadkee loam, in a stand of mixed hardwoods, one-quarter mile west of the crossing of U.S. Highway 501 over Opossum Creek, southeast of Lynchburg:

A1—0 to 5 inches, dark grayish-brown (2.5Y 4/2) loam; common, medium, distinct, dark yellowish-brown (10YR 3/4) mottles; moderate, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; few fine flakes of mica; medium acid; clear, smooth boundary.

B1g—5 to 15 inches, olive-gray (5Y 5/2) loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few medium and coarse roots; few fine flakes of mica; few fine dark concretions; medium acid; clear, smooth boundary.

B21g—15 to 23 inches, olive-gray (5Y 5/2) and gray (10YR

5/1) heavy loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, fine, prominent, yellowish-red (5YR 5/8) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few fine flakes of mica; medium acid; gradual, wavy boundary.

B22g—23 to 31 inches, olive-gray (5Y 5/2) and gray (10YR 5/1) light clay loam; common, fine, distinct, light olive-brown (2.5Y 5/4) mottles and few, fine, prominent, yellowish-red (5YR 4/8) mottles; weak, medium, subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots; few fine flakes of mica; few subrounded quartz pebbles; medium acid; clear, wavy boundary.

B3g—31 to 37 inches, dark-gray (N 4/0) light clay loam; few, coarse, prominent, brown (7.5YR 4/4) mottles and common, coarse, faint, olive-brown (2.5Y 4/4) mottles; massive; friable, slightly sticky and slightly plastic; few fine roots; few fine flakes of mica; many subrounded quartz pebbles; medium acid; clear, wavy boundary.

Cg—37 to 60 inches, mottled dark-gray (N 4/0) and dark grayish-brown (2.5Y 4/2) very gravelly loam; massive; very friable, slightly sticky; few fine roots; medium acid.

The solum is 30 to 60 inches thick. Subrounded quartz pebbles make up less than 1 percent to about 5 percent of the solum and 10 to 60 percent of the C horizon. Depth to bedrock is more than 5 feet. The A horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 or 2. The B horizon has hue of 5Y, 10YR, or N; value of 4 to 6; and chroma of 0 to 2. It has high-chroma mottles ranging from light olive brown and dark yellowish brown to yellowish red. It ranges from loam and light clay loam to silt loam, light silty clay loam, and sandy clay loam. The C horizon is commonly very gravelly loam, very gravelly sandy loam, or sand and gravel.

Wehadkee soils are similar to Chewacla, Forestdale, and Worsham soils. They are grayer and more poorly drained than Chewacla soils. They have less clay than Forestdale and Worsham soils and lack the Bt horizon typical of those soils.

Wehadkee soils are near Buncombe, Chewacla, Riverview, State, and Toccoa soils. They are grayer and more poorly drained than Buncombe, Riverview, State, and Toccoa soils.

Wd—Wehadkee loam. This soil is on low-lying flood plains of the larger streams in the survey area. It is generally away from the stream channel and close to the uplands. Slopes are dominantly 0 to 2 percent.

Included with this soil in mapping were scattered small areas of Augusta, Chewacla, Forestdale, and Wahee soils. Also included were small areas where the subsoil is sandy loam, small areas where a buried horizon is below a depth of about 30 inches, and spots of a gravelly soil.

Runoff is slow on this Wehadkee soil. The soil receives seepage and runoff from adjacent higher lying areas, is frequently flooded by nearby streams, and has a seasonal high water table at the surface or within a depth of 1 foot. Drainage is desirable if the soil is used for farming.

This soil is used mostly as woodland. It is poorly suited to cultivated crops because of excessive wetness and flooding. Capability unit IVw–1; woodland group 1w2.

White Store Series

The White Store series consists of deep, moderately well drained, nearly level to gently sloping soils that have a clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from Triassic sandstone and shale.

In a representative profile the surface layer is yellowish-brown loam 8 inches thick. The subsoil is 42 inches thick. The upper 23 inches is yellowish-brown, firm to very firm clay mottled with yellowish-red, red, and light brownish-gray in the lower part, and the lower 19 inches is alternating layers of gray, brown, and strong-brown, very firm clay; brownish and yellowish, weathered sandstone; and dark-brown shale. Dark-brown Triassic shale is at a depth of 50 inches.

Unless limed, White Store soils have a very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is very slowly permeable, and the available water capacity is low. The seasonal high water table is at a depth of 1½ to 2½ feet during wet periods.

Representative profile of White Store loam, 2 to 6 percent slopes, 1 mile northwest of State Route 650 and 200 feet south of Suck Creek, east of Gladys:

Ap—0 to 8 inches, yellowish-brown (10YR 5/4) loam; weak, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few weathered shale fragments; very slightly acid; abrupt, wavy boundary.

B21t—8 to 16 inches, yellowish-brown (10YR 5/8) clay; weak, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; many thin clay films; few weathered shale fragments; very strongly acid; clear, wavy boundary.

B22t—16 to 21 inches, yellowish-brown (10YR 5/4) clay; common, medium, distinct, yellowish-red (5YR 4/6) mottles; moderate, fine, angular blocky structure; very firm, sticky and plastic; few fine roots; thin, continuous clay films; few weathered shale fragments; very strongly acid; gradual, wavy boundary.

B23t—21 to 31 inches, yellowish-brown (10YR 5/4) clay; common, fine, faint, light brownish-gray (10YR 6/2) mottles and common, medium, distinct, red (2.5YR 4/6) mottles; moderate, fine, angular blocky structure; very firm, very sticky and very plastic; thin, continuous clay films; few weathered shale fragments; very strongly acid; clear, irregular boundary.

B3t—31 to 50 inches, alternating tilted layers of mottled gray (10YR 5/1), brown (10YR 5/3), and strong-brown (7.5YR 5/6) clay, brownish and yellowish weathered sandstone, and dark-brown, weathered shale; clay is ½ to 1 inch thick; weak, fine, subangular blocky structure; very firm, very sticky and very plastic; many thin clay films; very strongly acid; gradual, wavy boundary.

R—50 inches, dark-brown Triassic shale; light gray clay flows in seams.

The solum is 30 to 60 inches thick. Depth to bedrock is 3½ to 5 feet. The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. It is commonly loam or fine sandy loam. The Bt horizon has hue of 10 YR, 7.5YR, 5YR, or 2.5YR; value of 4 to 6; and chroma of 4 to 8. Mottles of chroma 2 or less are within the upper 24 inches of the Bt horizon. The B3t horizon commonly formed in beds of weathered sandstone and shale, which make up about 50 to 75 percent of the horizon. It is mottled gray and yellowish brown, strong brown, yellowish red, and red.

White Store soils are similar to Helena and Iredell soils. They have more exchangeable aluminum than Helena soils. They are more acid than Iredell soils.

White Store soils are near Mayodan, Penn, Pinkston, and Roanoke soils. They are not so well drained as Mayodan,

Penn, and Pinkston soils and have more clay than Penn and Pinkston soils. They are better drained than Roanoke soils and are not so gray throughout.

WeA—White Store fine sandy loam, 0 to 2 percent slopes. This soil is on broad flats of the Triassic lowlands. The surface layer is as much as 10 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Penn and Roanoke soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is slow on this White Store soil. The soil has a seasonal high table at a depth of 1½ to 2½ feet during wet periods, and artificial darinage is beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, pasture, tobacco, and woodland. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIw–2; woodland group 4c3.

WeB—White Store fine sandy loam, 2 to 6 percent slopes. This soil is on broad, slightly convex flats of the Triassic lowlands. It has a profile similar to the one described as representative of the series, but where moderately eroded, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Mayodan, Penn, and Pinkston soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is medium on this White Store soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The soil has a seasonal high water table at a depth of 1½ to 2½ feet, and drainage is often beneficial if the soil is cultivated.

The soil is used for corn, small grain, mixed hay, pasture, tobacco, and woodland. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIe–4; woodland group 4c3.

WgA—White Store loam, 0 to 2 percent slopes. This soil is on broad flats of the Triassic lowlands. The surface layer is as much as 10 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Penn and Roanoke soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is slow on this White Store soil. The soil has a seasonal high water table at a depth of 1½ to 2½ feet during wet periods, and artificial drainage is beneficial if the soil is cultivated.

This soil is used mostly as woodland. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIw–2; woodland group 4c3.

WgB—White Store loam, 2 to 6 percent slopes. This soil is on broad, slightly convex flats of the Triassic lowlands. It has the profile described as representative of the series, but where moderately eroded, the surface layer is only 4 to 6 inches thick.

Included with this soil in mapping were scattered small areas of Mayodan, Penn, and Pinkston soils. Also included were small areas where the soil is less than 40 inches deep over bedrock.

Runoff is medium on this White Store soil. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The seasonal high water table is at a depth of 1½ to 2½ feet, and drainage is often beneficial if the soil is cultivated.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIe–4; woodland group 4c3.

White Store Variant

The White Store variant consists of moderately deep to deep, somewhat poorly drained, nearly level to gently sloping soils that have a dominantly clayey subsoil. These soils are in low-lying areas of the Piedmont Upland. They formed in material weathered from Triassic sandstone and shale.

In a representative profile about 2 inches of undecomposed and partly decomposed forest litter overlies an 8-inch surface layer of dark yellowish-brown loam mottled with yellowish brown. The subsoil is 25 inches thick. The upper 6 inches is light brownish-gray, firm clay loam mottled with brown and dark brown; the next 5 inches is dark grayish-brown, very firm clay mottled with yellowish brown and gray; and the lower 14 inches is mottled dark yellowish-brown, gray, and yellowish-brown, very firm clay. Dark-red Triassic shale is at a depth of 33 inches.

Unless limed, these White Store soils have a strongly acid to very strongly acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is very slowly permeable, and the available water capacity is low. The seasonal high water table is at a depth of 1 foot to 1½ feet during wet periods.

Representative profile of White Store loam, wet variant, 0 to 2 percent slopes, in a stand of mixed hardwoods, about 300 feet northwest of State Route 650 and one-quarter mile south of Suck Creek, east of Gladys:

O1—2 inches to 1 inch, loose leaves and twigs.
O2—1 inch to 0, partly decomposed leaves and twigs.
A1—0 to 8 inches, dark yellowish-brown (10YR 4/4) loam; few, fine, faint, yellowish-brown (10YR 5/8) mottles; weak, fine, granular structure; friable, sticky and slightly plastic; many fine roots; few medium and coarse roots; few subrounded quartz pebbles; strongly acid; clear, smooth boundary.
B1tg—8 to 14 inches, light brownish-gray (2.5Y 6/2) clay loam; many, coarse, distinct, brown (10YR 5/3) mottles and common, medium, distinct, dark-brown (7.5YR 4/4) mottles; weak, fine, subangular blocky structure; firm, sticky and slightly plastic; many

fine roots; few medium and coarse roots; few thin clay films; common subrounded quartz pebbles; common shale fragments; black stains on faces; common dark concretions; stone line at a depth of 14 inches; strongly acid; clear, wavy boundary.

IIB21tg—14 to 19 inches, dark grayish-brown (10YR 4/2) clay; many, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, fine, faint, gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; very firm, sticky and very plastic; few fine, medium, and coarse roots; thin, continuous clay films; few shale fragments; strongly acid; gradual, wavy boundary.

IIB22tg—19 to 33 inches, mottled gray (10YR 5/1) and dark yellowish-brown (10YR 4/4) clay; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, subangular blocky structure; very firm, sticky and very plastic; few fine roots; common thin clay films; few shale fragments; strongly acid; clear, irregular boundary.

IIR1—33 to 43 inches, dark-red Triassic shale that can be dug with difficulty with spade.

IIR2—43 inches, dark-red Triassic shale.

The solum is 24 to 40 inches thick. It is less than 1 to about 10 percent small shale fragments. Subrounded quartz pebbles make up less than 1 percent to about 5 percent of the A horizon and the upper part of the Bt horizon. In many places a stone line is at a depth of about 12 to 18 inches. Depth to weathered rock is 20 to 40 inches, and depth to bedrock is 40 to 60 inches. The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The B21t horizon commonly has hue of 10YR, value of 4 or 5, and chroma of 2. It has many yellowish-brown and strong-brown mottles and few gray or light-gray mottles. The B22t horizon is commonly mottled in gray, light gray, dark yellowish brown, yellowish brown, or strong brown, or it is gray or light gray and has high-chroma mottles. The B2t horizon is clay. Dark-red, dark reddish-brown, or dark-brown, weathered Triassic sandstone or shale underlies the Bt horizon.

These White Store soils are similar to Iredell, Roanoke, and other White Store soils. They are more poorly drained than Iredell and other White Store soils and have a grayer solum. They are not so gray or so poorly drained as Roanoke soils.

These White Store soils are near Mayodan, Penn, Pinkston, and Roanoke soils. They are more poorly drained and are grayer than Mayodan, Penn, and Pinkston soils. Also, they have more clay than Penn and Pinkston soils.

WhA—White Store loam, wet variant, 0 to 2 percent slopes. This soil is on broad flats or in small depressions and at the heads of drainageways in the Triassic lowlands. It has the profile described as representative of the variant.

Included with this soil in mapping were scattered small areas of Penn and Roanoke soils. Also included were small areas of a White Store soil that has 2 to 8 inches of overwash on the surface.

Runoff is slow. The soil receives seepage and runoff from higher lying areas and has a seasonal high water table at a depth of 1 foot to 1½ feet during wet periods. Artificial drainage is beneficial if the soil is cultivated.

This soil is used mostly as pasture and woodland. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is commonly short lived because wetness is excessive in winter and spring. Capability unit IIIw–2; woodland group 2w1.

WhB—White Store loam, wet variant, 2 to 6 percent slopes. This soil is at the heads of drainageways and in low areas along weakly expressed drainageways of the Triassic lowlands.

Included with this soil in mapping were scattered small areas of Mayodan, Penn, and Pinkston soils. Also included were small areas of a White Store soil that has 2 to 8 inches of overwash on the surface.

Runoff is medium. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled. The seasonal high water table is at a depth of 1 foot to 1½ feet, and drainage is often beneficial if the soil is cultivated.

This soil is used for small grain, mixed hay, pasture, and woodland. If adequately drained, limed, and fertilized, it is moderately well suited to most locally grown crops. If grown, alfalfa is generally short lived because wetness is excessive in winter and spring. Capability unit IIIe–4; woodland group 2w1.

Wilkes Series

The Wilkes series consists of moderately deep, well-drained, gently sloping to steep soils that have a dominantly clayey subsoil. These soils are on the Piedmont Upland. They formed in material weathered from greenstone, hornblende gneiss, diorite, and mica schist.

In a representative profile about 1 inch of undecomposed and decomposed forest litter overlies a 4-inch surface layer of dark-brown loam. The subsoil is 7 inches of strong-brown, friable clay. The substratum, to a depth of 29 inches, is weathered mica schist and greenstone that crush to loam. Mica schist and greenstone are at a depth of 29 inches.

Wilkes soils are medium acid to neutral. They have a low content of organic matter and low natural fertility. Permeability is moderately slow, and the available water capacity is low.

Representative profile of Wilkes loam, 6 to 15 percent slopes, in a stand of small pine and dogwood, one-eighth mile west-northwest of State Route 711 bridge over Southern Railroad, north of Lynch Station:

O1—1 to ½ inch, loose pine needles and twigs.

O2—½ inch to 0, decomposed forest litter.

Ap—0 to 4 inches, dark-brown (10YR 4/3) loam; weak, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; few fine flakes of mica; slightly acid; abrupt, smooth boundary.

B2t—4 to 11 inches, strong-brown (7.5YR 5/6) clay; weak, fine, subangular blocky structure; friable, slightly sticky and plastic; few fine and medium roots; thin, continuous clay films; common fine flakes of mica; slightly acid; clear, wavy boundary.

C1—11 to 21 inches, black (10YR 2/1) and strong-brown (7.5YR 5/6), strongly weathered mica schist that crushes to loam; massive; friable, slightly sticky and slightly plastic; few fine roots; yellowish-red (5YR 5/6) clay flows in seams; slightly acid; clear, wavy boundary.

C2—21 to 29 inches, light olive-brown (2.5Y 5/4), strong-brown (7.5YR 5/6), and black (10YR 2/1) mica schist and greenstone that crush to loam with difficulty; massive; few fine roots; thin yellowish-red (5YR 5/6) clay flows in seams; slightly acid; gradual, wavy boundary.

R—29 inches, mica schist and greenstone.

The solum is less than 20 inches thick. Depth to bedrock is 20 to 48 inches. The A horizon has hue of 10YR, 7.5YR,

or 2.5Y; value of 4 to 6; and chroma of 2 to 4. It is commonly loam, but ranges to clay loam where the soil is severely eroded. The Bt horizon has hue of 7.5YR, 5YR, or 10YR; value of 4 or 5; and chroma of 4 to 8. It is commonly clay, but ranges to clay loam, silty clay loam, and loam. The C horizon is commonly strongly weathered greenstone, hornblende gneiss, diorite, and mica schist that crush to loam, fine sandy loam, or clay loam.

Wilkes soils are similar to Bremo, Enon, Louisburg, Manteo, Mecklenburg, and Tallapoosa soils. They have a Bt horizon, which Bremo, Louisburg, and Manteo soils lack. They have a thinner solum and less clay than Enon and Mecklenburg soils. They have more than 35 percent base saturation, whereas Tallapoosa soils have less than 35 percent.

Wilkes soils are near Appling, Bremo, Cecil, Cullen, Enon, Gwinnett, Helena, Iredell, and Mecklenburg soils. They have a thinner solum and less clay than Appling, Cecil, Cullen, Gwinnett, Helena, and Iredell soils. They are better drained than Helena and Iredell soils.

WkB—Wilkes loam, 2 to 6 percent slopes. This soil is on broad, convex ridgetops. In places the surface layer is 6 to 8 inches thick, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Bremo, Cullen, Enon, and Mecklenburg soils. Also included were small areas where the soil is less than 20 or more than 48 inches deep over bedrock.

Runoff is medium on this Wilkes soil, and the soil is somewhat droughty during the growing season. Erosion is a severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. If adequately limed and fertilized, it is moderately well suited to most locally grown crops. Capability unit IIIe–2; woodland group 4o1.

WkD—Wilkes loam, 6 to 15 percent slopes. This soil is on narrow, winding, convex ridgetops and on complex side slopes. It has the profile described as representative of the series, but in places the surface layer is 6 to 8 inches thick.

Included with this soil in mapping were scattered small areas of Bremo, Cullen, Enon, Manteo, Mecklenburg, and Tallapoosa soils and small areas where the soil is less than 20 or more than 48 inches deep over bedrock. Also included were small gullies.

Runoff is medium to rapid on this Wilkes soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed or clean tilled.

This soil is used for corn, small grain, mixed hay, pasture, and woodland. It is poorly suited to cultivated crops because of the droughtiness, the slope, and the very severe erosion hazard. It is better suited to small grain, mixed hay, and drought-resistant pasture grasses and trees. Capability unit IVe–2; woodland group 4o1.

WkE—Wilkes loam, 15 to 25 percent slopes. This soil is on short, convex side slopes along drainageways. Where more severely eroded, the surface layer is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Bremo, Louisburg, Manteo, and Tallapoosa soils and small scattered areas where the soil is less than 20 inches deep over bedrock. Also included were gullies.

Runoff is rapid on this Wilkes soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is used mostly as woodland, but small areas are in pasture. It is suited to drought-resistant grasses and trees. Capability unit VIe–2; woodland group 4r2.

WkF—Wilkes loam, 25 to 60 percent slopes. This soil is on short, convex side slopes along drainageways and small streams. Where more severely eroded, the surface layer is clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included with this soil in mapping were scattered small areas of Bremo, Louisburg, Manteo, and Tallapoosa soils. Also included were scattered small areas where the soil is less than 20 inches deep over bedrock and scattered small gullies.

Runoff is rapid on this Wilkes soil, and the soil is droughty during the growing season. Erosion is a very severe hazard where the soil is disturbed and exposed.

This soil is used as woodland. Capability unit VIIe–1; woodland group 4r2.

WlE3—Wilkes soils, 15 to 25 percent slopes, severely eroded. This mapping unit is on short, convex side slopes along drainageways. The surface layer ranges from loam to clay loam, but the profile is otherwise similar to the one described as representative of the series.

Included in this unit in mapping were small areas of Bremo, Louisburg, Manteo, and Tallapoosa soils and areas where the soil is less than 20 inches deep over bedrock. Also included were deep gullies.

Runoff is rapid, and the soils are droughty during the growing season. Erosion is a very severe hazard where the soils are disturbed and exposed.

This mapping unit is used as woodland. Capability unit VIIe–1; woodland group 4r2.

Worsham Series

The Worsham series consists of deep, poorly drained, nearly level to gently sloping soils that have a dominantly clayey subsoil. These soils are in depressions, at the base of slopes, at the heads of drainageways, and along drainageways. They formed in alluvium washed from higher lying adjacent soils.

In a representative profile about 1 inch of undecomposed and partly decomposed forest litter overlies a 5-inch surface layer of dark-gray and gray fine sandy loam. The lower part is mottled with yellowish brown and yellowish red. The subsoil is 55 inches thick. The upper 5 inches is grayish-brown, friable clay loam; the next 10 inches is gray, firm clay mottled with yellowish red; the next 11 inches is mottled gray, yellowish-brown, and strong-brown, firm clay; and the lower 29 inches is gray, firm clay mottled with light brownish gray, yellowish brown, light gray, and strong brown.

Worsham soils have a strongly acid to very strongly

acid subsoil. They have a low content of organic matter and low natural fertility. The subsoil is slowly permeable, and the available water capacity is medium. The seasonal high water table is at the surface or within a depth of 1 foot, and the soils are frequently flooded.

Representative profile of Worsham fine sandy loam, in an area of Worsham soils, 0 to 4 percent slopes, in a stand of mixed hardwoods and pine, about 300 feet east of junction of State Routes 600 and 616, southeast of Morris Church:

O1—1 to ½ inch, loose leaves and twigs.
O2—½ inch to 0, partly decomposed leaves and twigs.
A1—0 to 2 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine, granular structure; very friable; slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; very strongly acid; clear, smooth boundary.
A2—2 to 5 inches, gray (10YR 5/1) fine sandy loam; few, medium, distinct, yellowish-brown (10YR 5/8) mottles and few, fine, prominent, yellowish-red (5YR 4/6) mottles; weak, fine, granular structure; friable, slightly sticky and slightly plastic; many fine roots; few medium and coarse roots; very strongly acid; clear, smooth boundary.
B1tg—5 to 10 inches, grayish-brown (2.5Y 5/2) clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) mottles and common, medium, prominent, yellowish-red (5YR 4/6) mottles; weak, fine, subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few medium and coarse roots; few thin clay films; strongly acid; clear, smooth boundary.
B21tg—10 to 20 inches, gray (N 5/0) clay; many, medium, prominent, yellowish-red (5YR 4/6) mottles and few, medium, faint, gray (10YR 5/1) mottles; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine, medium, and coarse roots; common thin clay films; strongly acid; gradual, wavy boundary.
B22tg—20 to 31 inches, mottled gray (10 YR 5/1), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/6) clay; moderate, medium, subangular blocky structure; firm, sticky and plastic; few fine roots; common thin clay films; very strongly acid; gradual, irregular boundary.
B23tg—31 to 50 inches, ped interiors are gray (10YR 6/1) clay; common, coarse, distinct, light brownish-gray (2.5Y 6/2) mottles and common, medium, distinct, yellowish-brown (10YR 5/6) mottles; ped coatings are light gray (N 6/0); many, coarse, distinct, yellowish brown (10YR 5/6) mottles and common, medium, distinct, strong-brown (7.5YR 5/6) mottles; moderate, coarse, subangular blocky structure; firm, sticky and plastic; few fine roots; thin, continuous clay films; few subrounded quartz pebbles; very strongly acid; gradual, wavy boundary.
B24tg—50 to 60 inches, ped interiors are gray (10YR 6/1) clay; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; ped coatings are light gray (N 6/0); common, coarse, distinct, yellowish-brown (10YR 5/6) mottles and few, medium, prominent, yellowish-red (5YR 4/6) mottles; weak, coarse, angular blocky structure; firm, sticky and slightly plastic; few fine roots; thin, continuous clay films; few subrounded quartz pebbles; very strongly acid.

The solum is 40 to more than 60 inches thick. It is about 2 to 10 percent subrounded quartz pebbles. Depth to bedrock is more than 5 feet. The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is fine sandy loam, sandy loam, loam, or silt loam. The Bt horizon has hue of 10YR, 2.5Y, or N; value of 0 to 2; and chroma of 4 to 6. High-chroma mottles, which commonly occur in the Bt horizon, range from light olive brown to yellowish red. The Bt horizon is commonly clay, but ranges to sandy clay and heavy clay loam.

Worsham soils are similar to Elbert, Forestdale, and Roanoke soils. They contain less silt and more sand than Roanoke soils. Clay minerals in Worsham soils are mixed, whereas in Elbert and Forestdale soils they are montmorillonitic.

Worsham soils are near Abell, Appling, Cecil, Louisburg, Manteo, Masada, Nason, Tatum, and Vance soils. They are more poorly drained and grayer than those soils.

WoB—Worsham soils, 0 to 4 percent slopes. This mapping unit is in depressions, at the base of slopes, at the heads of drainageways, and along drainageways. The surface layer ranges from fine sandy loam to loam and silt loam, but the profile is otherwise similar to the one described as representative of the series.

Included in this unit in mapping were scattered small areas of Abell, Elbert, and Masada soils. Also included were small areas where the slope is more than 4 percent.

Runoff is slow. This mapping unit receives seepage and runoff from adjacent higher lying areas, has a seasonal high water table at the surface or within a depth of 1 foot, and is frequently flooded.

This mapping unit is used mostly as pasture and woodland. It is poorly suited to cultivated crops because of excessive wetness and flooding. Capability unit Vw–1; woodland group 2w3.

Use and Management of the Soils

This section describes the general management of the soils for crops and pasture, woodland, and wildlife. It also gives information about soil characteristics significant in engineering and in town and country planning.

Crops and Pasture

The pages that follow explain basic principles of management for crops and pasture. They also define the capability classification used by the Soil Conservation Service and suggest use and management of the soils by capability units.

Soil fertility.—Many of the soils in Campbell County and the city of Lynchburg are highly leached and consequently are strongly acid and generally low in essential plant nutrients. Crops and pasture plants generally respond well to applications of lime and fertilizer. The amount of lime and fertilizer to be applied depends on past cropping history, on the type of soil, on the crops to be grown, and on the yield desired. It should be based largely on the results of laboratory analysis of soil samples. Information and instruction for collecting and testing soil samples can be obtained from the local office of the Soil Conservation Service or Cooperative Extension Service.

Soil structure.—Excessive tillage tends to destroy soil structure. As a result the infiltration rate of the soil is generally lowered, and tilth in the seedbed is less favorable. Essential tillage should be confined to the period of optimum moisture content of the soil to

help prevent the formation of clods or crusts. Minimum tillage is especially important on the moderately eroded or severely eroded soils, where the plow layer generally has a higher clay content than that of uneroded soils. Tillage should be the minimum needed to prepare a seedbed and control weeds. Close-growing crops or grasses and legumes in rotation with row crops help to prevent deterioration of tilth. Soil compaction and deterioration of tilth also result if livestock trample wet soils. Soil compaction results in increased runoff and a less favorable root zone for pasture plants.

Erosion.—Soils in capability units IIe, IIIe, IVe, VIe, and VIIe are subject to water erosion, and controlling erosion is a major concern if these soils are cultivated over a period of time. Farming has declined in the survey area partly because of past erosion. Erosion is presently controlled by contour stripcropping (fig. 6), terraces or diversions, grassed waterways, use of crop residue, minimum tillage, permanent grass or vegetation, and grass or close-growing crops in rotation with row crops. Management in an area depends mainly on the needs of the farmer and the kind of soil. Assistance in controlling erosion can be obtained from the local office of the Soil Conservation Service.

Artificial drainage.—Excessive soil wetness is at least a seasonal concern on the soils in capability units IIw, IIIw, IVw, and Vw. The soils in capability units IIw, IIIw, and IVw can normally be artificially drained, but difficulty increases on the soils in capability units IIIw and IVw. Surface ditches, tile drains, or both are generally used. Crops and pasture plants are generally improved as a result of adequate drainage. The soils in capability unit Vw are not commonly drained. If only tile drains are used, Elbert soils or White Store soils that have a clayey subsoil drain slowly.

Cropping systems.—The choice of an appropriate cropping system is a major concern. All soils have physical and chemical characteristics that affect their potential for cultivation. The cropping system should not result in excessive soil loss. It should meet the needs of the farmer and be consistent with the capability of the soils. Cropping systems range from continuous row crops to various kinds of rotation or to permanent grass or vegetation. Assistance in choosing an appropriate cropping system can be obtained from the district conservationist of the Soil Conservation Service.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the

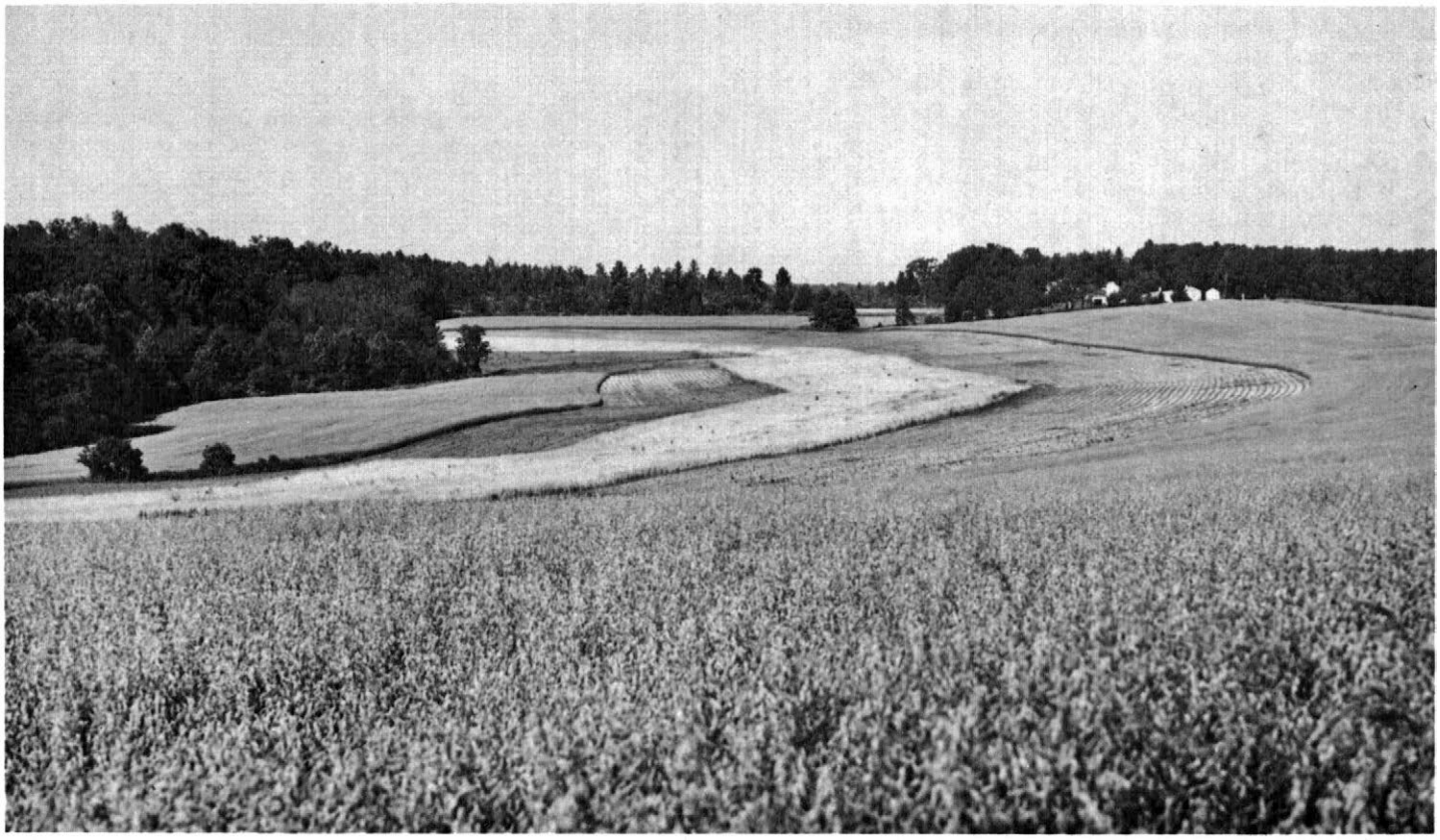


Figure 6.—Contour stripcropping on cultivated Cullen loam, 6 to 15 percent slopes, eroded, and Madison loam, 6 to 15 percent slopes, eroded. Both soils are in capability unit IIIe-1.

soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, all kinds of soil are grouped at three levels; the capability class, the subclass, and the unit. These levels are defined in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use. (None in the survey area.)

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife.

Class VI soils have severe limitations that make them generally unsuitable for cultivation and limit their use largely to pasture or range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuitable for cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife, water supply, or to esthetic purposes. (None in the survey area.)

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold to too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture or range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–4 or IIIe–6. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units

The following pages describe the capability units in Campbell County and the city of Lynchburg and suggest the use and management of the soils. The "Guide to Mapping Units" at the back of this publication shows the capability classification of each mapping unit.

Each capability unit description indicates the general characteristics of the soils in the unit, their suitability for crops, and the major limitations or hazards to use for crops and pasture. It is not within the scope of this publication to present detailed management recommendations. There are, for example, many different combinations of cropping systems and measures that can control erosion. Management can vary from farm to farm. Assistance in planning appropriate cropping systems, erosion control, and artificial drainage; in selecting proper plant varieties; and in otherwise managing a farm can be obtained from the local office of the Soil Conservation Service or Cooperative Extension Service.

CAPABILITY UNIT IIe–1

This unit consists of deep, well-drained, gently sloping soils. These soils are on uplands or on stream terraces that generally are not subject to flooding. The soils are slightly eroded to moderately eroded.

The surface layer is friable and erodible. The subsoil is dominantly clayey, but in places is sandy clay loam or clay loam. Permeability is mainly moderate, but on a small acreage is moderately rapid. Available water capacity is medium, and the root zone is deep. Unless limed, the soils are strongly acid to medium acid in the root zone. Depth to bedrock is commonly more than 5 feet, but on a small acreage about 3 to 5 feet. These soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is medium. The erosion hazard is moderate where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates.

These soils are suited to commonly grown field crops, hay, and pasture plants. They are also suited to row crops (fig. 7) if erosion is controlled. A good cropping system is essential. The soils are suited to sprinkler irrigation if erosion is controlled.

CAPABILITY UNIT IIe–2

This unit consists of deep, well drained and moderately well drained, gently sloping soils on uplands or on stream terraces. The soils on stream terraces are occasionally flooded. All the soils are slightly eroded to moderately eroded.

The surface layer is friable and erodible. The subsoil is dominantly clayey. Permeability is moderate to slow, available water capacity is medium, and the root zone is deep. Unless limed, the soils are very strongly acid to neutral in the root zone. Depth to bedrock ranges from 3½ feet to more than 5 feet. The soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is medium. The erosion hazard is moderate where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. On a small acreage the moderately well drained soils commonly receive seepage and runoff from higher lying areas. Artificial drainage helps reduce the resulting seasonal wetness.

Figure 7.—Corn on Cullen loam, 2 to 6 percent slopes. Many soils in capability unit IIe–1 are on broad, gently sloping ridges and are suited to row crops.

These soils are suited to commonly grown field crops, hay, and pasture plants. Alfalfa is shorter lived on the moderately well drained soils because of seasonal wetness. The soils are suited to row crops if erosion is controlled. They are poorly suited to sprinkler irrigation.

CAPABILITY UNIT IIe–4

This unit consists of deep and moderately deep, well-drained, gently sloping soils on uplands. These soils are slightly eroded.

The surface layer is friable and erodible. The subsoil is dominantly clayey or loamy. Permeability is moderate or moderately rapid, available water capacity is medium or low, and the root zone is moderately deep or deep. Unless limed, the soils are medium acid to very strongly acid in the root zone. Depth to bedrock ranges from about 20 inches to 5 feet. The soils have only low to medium capacity to store and release plant nutrients for crop use.

Runoff is medium. The erosion hazard is moderate where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates.

These soils are suited to commonly grown field crops, hay, and pasture plants. They are also suited to row crops if erosion is controlled. A good cropping system is essential. The soils are suited to sprinkler irrigation if erosion is controlled.

CAPABILITY UNIT IIe–5

This unit consists of deep, well-drained, gently sloping soils on uplands or on stream terraces that generally are not subject to flooding. On most of the acreage these soils are slightly eroded, but on a small acreage they are moderately eroded.

The surface layer is friable and erodible. In places it contains enough pebbles to damage and dull plowshares. The subsoil is dominantly clayey. Permeability is moderate, available water capacity is medium, and the root zone is deep. Unless limed, the soils are strongly acid to very strongly acid in the root zone. Depth to bedrock is commonly more than 5 feet. The soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is medium. The erosion hazard is moderate where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates.

These soils are suited to commonly grown field crops, hay, and pasture plants and are especially suited to bright tobacco and dark tobacco. They are also suited to row crops if erosion is controlled. A good cropping system is essential. The soils are suited to sprinkler irrigation if erosion is controlled.

CAPABILITY UNIT IIw–1

This unit consists of deep, well-drained, nearly level

to very gently sloping soils. These soils are on flood plains and low terraces along the larger streams of the survey area.

The surface layer is thick and friable. The subsoil ranges from fine sandy loam and loam to sandy clay loam, clay loam, and clay. Permeability is moderate to moderately rapid, available water capacity is medium to high, and the root zone is deep. Unless limed, the soils are slightly acid to very strongly acid in the root zone. Depth to bedrock is more than 5 feet. The soils have medium to high capacity to store and release plant nutrients for crop use.

Flooding is the chief concern. It commonly occurs in spring and early in summer, and as a result high-value crops generally are not grown. Local silting is a concern in some areas after flooding.

These soils are suited to summer crops, including truck crops, that can be planted after the normal flooding season. There is little or no erosion hazard, and row crops can be grown year after year if improved management is used. The soils are suited to pasture and hay plants that can withstand some flooding. They are suited to sprinkler irrigation.

CAPABILITY UNIT IIw–2

This unit consists of deep, moderately well drained to well drained, nearly level to very gently sloping soils at the heads of drainageways, along drainageways, in depressions, and on low terraces.

The surface layer is friable. The subsoil is sandy clay loam, clay loam, or clay. Permeability is moderate to moderately slow, available water capacity is medium, and the root zone is deep. Unless limed, the soils are strongly acid to very strongly acid in the root zone. Depth to bedrock is more than 5 feet. The soils have medium to high capacity to store and release plant nutrients for crop use.

These soils commonly receive seepage and surface runoff from higher lying areas. Some are subject to flooding from nearby streams. Local silting is a concern in places. Artificial drainage helps reduce seasonal wetness.

These soils are suited to commonly grown field crops, hay, and pasture plants. Alfalfa is shorter lived because of seasonal wetness. There is little or no erosion hazard, and row crops can be grown year after year if improved management is used. The soils are suited to pasture and hay plants that can withstand some seasonal wetness. They are suited to sprinkler irrigation.

CAPABILITY UNIT IIs–1

Penn silt loam, 0 to 2 percent slopes, the only soil in this unit, is a moderately deep, well-drained soil on upland flats.

The surface layer is thick and friable, and the subsoil is loamy. Permeability is moderate to moderately rapid, available water capacity is low, and the root zone is moderately deep. Unless limed, the soil is medium acid to strongly acid in the root zone. Depth to bedrock ranges from about 20 to 40 inches. The soil has only low to medium capacity to store and release plant nutrients for crop use.

Runoff is slow. There is little or no erosion hazard. The soil is somewhat droughty during the growing season. Crop response to applications of lime and fertilizer is somewhat limited by the low to medium capacity to store and release plant nutrients and by the low available water capacity.

This soil is moderately well suited to commonly grown field crops, hay, and pasture plants. It is also moderately well suited to row crops if improved management is used. The soil is suited to sprinkler irrigation.

CAPABILITY UNIT IIIe–1

This unit consists of deep, well-drained, sloping soils on uplands. These soils are moderately eroded.

The surface layer is friable and erodible. The subsoil is dominantly clayey. Permeability is moderate, available water capacity is medium, and the root zone is deep. Unless limed, the soils are very strongly acid to medium acid in the root zone. Depth to bedrock is commonly more than 5 feet, but on a small acreage is about 3 to 5 feet. The soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is medium to rapid. The erosion hazard is severe where the soils are cultivated or where the pasture vegetation is thin. As slope increases, controlling erosion becomes more difficult. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates.

These soils are moderately well suited to commonly grown field crops, hay, and pasture plants. They are also moderately well suited to row crops if erosion is controlled. A good cropping system is essential. The soils are suited to sprinkler irrigation if erosion is controlled.

CAPABILITY UNIT IIIe–2

This unit consists of deep and moderately deep, well-drained to excessively drained, gently sloping to sloping soils on uplands. Most of these soils are slightly eroded, but some are moderately eroded.

The surface layer is friable and erodible. The subsoil ranges from fine sandy loam to clay. Permeability is moderately slow to moderately rapid, available water capacity is low to medium, and the root zone is moderately deep to deep. Unless limed, the soils are very strongly acid to neutral in the root zone. Depth to bedrock ranges from about 20 inches to 5 feet. The soils have only low to medium capacity to store and release plant nutrients for crop use.

Runoff is medium to rapid. The erosion hazard is severe where the soils are cultivated or where the pasture vegetation is thin. As slope increases, controlling erosion becomes more difficult. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. Some of the soils are droughty during the growing season.

These soils are moderately well suited to commonly grown field crops, hay, and pasture plants. They are also moderately well suited to row crops if erosion is controlled. A good cropping system is essential. The

soils are suited to sprinkler irrigation if erosion is controlled.

CAPABILITY UNIT IIIe–3

This unit consists of deep, well-drained, gently sloping soils on uplands. Some of these soils are severely eroded. Others have a slightly eroded clay loam surface layer.

The clay loam surface layer is dominantly sticky when wet. It is difficult to work and keep in good tilth. It has a low content of organic matter, forms a crust after hard rains, and tends to clod if tilled when wet. The subsoil is dominantly clayey. Permeability is moderate, available water capacity is medium, and the root zone is deep. Unless limed, the soils are very strongly acid to medium acid in the root zone. Depth to bedrock is commonly more than 5 feet. The soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is medium. The erosion hazard is severe where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. The potential crop production on these soils is considerably less than on the less eroded soils of the same series and slope range.

These soils are moderately well suited to commonly grown field crops, hay, and pasture plants. A high level of management is generally needed to ensure good stands of alfalfa and other legumes and grasses. These soils are moderately well suited to row crops if erosion is controlled. A good cropping system is essential. The soils do not withstand soil loss, in tons per acre per year, so well as the less eroded soils. Because of poor tilth in the plow layer, they are poorly suited to sprinkler irrigation.

CAPABILITY UNIT IIIe–4

This unit consists of deep, well-drained to somewhat poorly drained, gently sloping or sloping soils on uplands. These soils are slightly eroded to moderately eroded.

The surface layer is friable and erodible. The subsoil is dominantly firm to very firm, sticky and plastic clay. Permeability is slow to very slow, available water capacity is low to medium, and the root zone is moderately deep. Unless limed, the soils are very strongly acid to moderately alkaline in the root zone. Many have a seasonal high water table at a depth of 1 foot to 2½ feet. All have only low capacity to store and release plant nutrients for crop use.

Runoff is medium to rapid. The erosion hazard is severe where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. Artificial drainage helps reduce seasonal wetness in the moderately well drained and somewhat poorly drained soils.

These soils are moderately well suited to commonly grown field crops, hay, and pasture plants. Planting is often delayed in spring because the soils dry out slowly. Alfalfa is commonly short lived and pasture plants are limited because of seasonal wetness. The soils are also moderately well suited to row crops if erosion is controlled. A good cropping system is essential. The soils are poorly suited to sprinkler irrigation.

CAPABILITY UNIT IIIe–6

This unit consists of deep, well-drained, sloping soils on uplands or on stream terraces that generally are not subject to flooding. These soils are slightly eroded to moderately eroded.

The surface layer is friable and erodible. In places it contains enough pebbles to damage and dull plowshares. The subsoil is dominantly clayey. Permeability is moderate, available water capacity is medium, and the root zone is deep. Unless limed, the soils are strongly acid to very strongly acid in the root zone. Depth to bedrock is commonly more than 5 feet. The soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is medium to rapid. The erosion hazard is severe where the soils are cultivated or where the pasture vegetation is thin. As slope increases, controlling erosion becomes more difficult. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates.

These soils are moderately well suited to the commonly grown field crops, hay, and pasture plants. They are suited to bright tobacco and dark tobacco. The soils are moderately well suited to row crops if erosion is controlled. A good cropping system is essential. The soils are suited to sprinkler irrigation if erosion is controlled.

CAPABILITY UNIT IIIw–1

This unit consists of deep, well-drained or somewhat poorly drained, nearly level soils. These soils are on flood plains along streams and the larger drainageways of the survey area.

The surface layer is thick and friable, and the underlying layers are fine sandy loam, loam, and silty clay loam. Permeability is moderate to moderately rapid, available water capacity is medium to high, and the root zone is deep. Unless limed, the soils are slightly acid to strongly acid in the root zone. The seasonal high water table is at a depth of 1 foot to 3 feet. Depth to bedrock is commonly more than 5 feet. The soils have a high capacity to store and release plant nutrients for crop use.

Flooding and seasonal wetness are the chief concerns. Flooding commonly occurs in spring and early in summer, and as a result high-value crops commonly are not grown. Local silting is a concern in some areas after flooding. Artificial drainage helps reduce seasonal wetness.

These soils are suited to summer crops, including truck crops, that can be planted after the normal flooding season. There is little or no erosion hazard, and row crops can be grown year after year if improved management is used. The soils are suited to pasture and hay plants that can withstand flooding and seasonal wetness. They are suited to sprinkler irrigation.

CAPABILITY UNIT IIIw-2

This unit consists of deep to moderately deep, moderately well drained to somewhat poorly drained, nearly level soils. These soils are on upland flats or on low stream terraces that are frequently flooded.

The surface layer is friable. The subsoil is dominantly firm to very firm, sticky and plastic clay, but is clay loam in places. Permeability is very slow to moderate, available water capacity is low to medium, and the root zone is moderately deep. Unless limed, the soils are very strongly acid to medium acid in the root zone. The seasonal high water table is at a depth of 1 foot to 2½ feet. Depth to bedrock ranges from about 20 inches to more than 5 feet. The soils have only low to medium capacity to store and release plant nutrients for crop use.

These soils commonly receive seepage and runoff from higher lying areas. Many are ponded after heavy rain. Flooding and seasonal wetness are the chief concerns. Artificial drainage helps reduce seasonal wetness.

These soils are moderately well suited to some of the commonly grown field crops and to commonly grown hay and pasture plants that can withstand flooding and seasonal wetness. Alfalfa is short lived because of flooding and seasonal wetness. These soils are poorly suited to sprinkler irrigation.

CAPABILITY UNIT IIIs-1

Buncombe loamy fine sand, the only soil in this unit, is a deep, excessively drained, nearly level to gently sloping soil on flood plains along the larger streams of the survey area.

The surface layer is thick and friable, and the substratum is dominantly loamy fine sand. Permeability is rapid, available water capacity is low, and the root zone is deep. Unless limed, the soil is slightly acid to medium acid in the root zone. Depth to bedrock is commonly more than 5 feet. The soil has only low capacity to store and release plant nutrients for crop use.

This soil is droughty during the growing season because available water capacity is low. Crop response to applications of lime and fertilizer is limited by the low capacity to store and release plant nutrients and by the low available water capacity. Flooding is a concern.

This soil is moderately well suited to the commonly grown field crops, hay, and pasture plants. It is better suited to hay and pasture plants that can withstand droughtiness and flooding. The soil is moderately well suited to sprinkler irrigation.

CAPABILITY UNIT IVe-1

This unit consists of deep, well-drained, moderately steep soils on uplands. Most of the soils are moderately eroded, but some are only slightly eroded.

The surface layer is friable and erodible. In places it contains enough pebbles to damage and dull plowshares. The subsoil is dominantly clayey. Permeability is dominantly moderate, but in small areas is slow. Available water capacity is medium, and the root zone is deep. Unless limed, the soils are very strongly acid to neutral in the root zone. Depth to bedrock is 3 to 5 feet or more. The soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is rapid. The erosion hazard is very severe where the soils are cultivated or where the pasture vegetation is thin. As slope increases, controlling erosion becomes more difficult. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. The soils are commonly somewhat droughty during the growing season.

These soils are poorly suited to the commonly grown field and row crops because of the droughtiness during the growing season, the slope, and the very severe erosion hazard. They are better suited to the commonly grown hay and pasture plants. They are poorly suited to sprinkler irrigation.

CAPABILITY UNIT IVe-2

This unit consists of moderately deep to deep, well-drained to excessively drained, sloping soils on uplands. Most of these soils are slightly eroded.

The surface layer is friable and erodible. The soils do not withstand soil loss so well as most other soils on uplands in the survey area. The subsoil ranges from fine sandy loam and loam to clay loam and clay. Permeability is rapid to moderately slow, available water capacity is low, and the root zone is moderately deep. Unless limed, the soils are very strongly acid to neutral in the root zone. Depth to bedrock ranges from about 20 inches to about 5 feet. The soils have only low capacity to store and release plant nutrients for crop use.

Runoff is medium to rapid. The erosion hazard is very severe where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. The soils are droughty during the growing season.

These soils are poorly suited to commonly grown field crops, hay, and pasture plants. Crop response to applications of lime and fertilizer is limited by the low available water capacity, the moderately deep root zone, and the low capacity to store and release plant nutrients for crop use. The soils are better suited to close-growing crops than to row crops. Drought-resistant pasture and hay plants should be selected.

CAPABILITY UNIT IVe-3

This unit consists of deep, well-drained, sloping soils on uplands. Some of these soils are severely eroded. Others have a slightly eroded clay loam surface layer.

The clay loam plow layer is sticky when wet. It is difficult to work and keep in good tilth. It has a low content of organic matter, forms a crust after hard rains, and tends to clod if tilled when wet. The subsoil is dominantly clayey. Permeability is moderate, available water capacity is medium, and the root zone is deep. The soils are very strongly acid to medium acid in the root zone unless they are limed. Depth to bedrock ranges from about 3½ feet to more than 5 feet. The soils have only medium capacity to store and release plant nutrients for crop use.

Runoff is medium to rapid. The erosion hazard is

very severe where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. The potential crop production on these soils is considerably less than on the less eroded soils of the same series and slope range.

These soils are poorly suited to commonly grown field crops, hay, and pasture plants. A high level of management is generally needed to insure good stands of alfalfa and other legumes and grasses. The soils are poorly suited to row crops. They do not withstand soil loss, in tons per acre per year, so well as the less eroded soils. Because of poor tilth in the plow layer, these soils are poorly suited to sprinkler irrigation.

CAPABILITY UNIT IVe–4

This unit consists of deep, moderately well drained to somewhat poorly drained, gently sloping to sloping soils on uplands. These soils are slightly eroded to moderately eroded.

The surface layer is friable and erodible. The subsoil is dominantly firm, sticky and plastic clay. Permeability is slow, available water capacity is medium, and the root zone is moderately deep. Unless limed, the soils are medium acid to moderately alkaline in the root zone. They have a seasonal high water table at a depth of 1½ to 2½ feet. Depth to bedrock ranges from 3½ to 5 feet. The soils have only low capacity to store and release plant nutrients for crop use.

Runoff is medium. The erosion hazard is very severe where the soils are cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. The soils are somewhat droughty during the growing season.

These soils are poorly suited to commonly grown field crops, hay, and pasture plants. Planting is often delayed in the spring because the soils dry out slowly. Alfalfa is short lived and pasture plants are limited because of seasonal wetness. The soils are better suited to close-growing crops than to row crops. Drought-resistant pasture and hay plants should be selected.

CAPABILITY UNIT IVe–5

Cecil cobbly fine sandy loam, 6 to 15 percent slopes, the only soil in this unit, is a deep, well-drained soil on uplands. It is only slightly eroded.

The surface layer is friable and contains enough cobbles to damage and dull plowshares. The subsoil is dominantly clayey. Permeability is moderate, available water capacity is medium, and the root zone is deep. Unless limed, the soil is strongly acid to very strongly acid in the root zone. Depth to bedrock is more than 5 feet. This soil has only medium capacity to store and release plant nutrients for crop use.

Runoff is medium to rapid. The erosion hazard is very severe where the soil is cultivated or where the pasture vegetation is thin. If excessive soil loss continues, crop yields are likely to decline and tilth deteriorates. The soil is somewhat droughty during the growing season.

This soil is poorly suited to commonly grown field crops and row crops because of the cobbles and the droughtiness during the growing season. It is better suited to drought-resistant hay and pasture plants.

CAPABILITY UNIT IVw–1

Wehadkee loam, the only soil in this unit, is a deep, poorly drained, nearly level soil. It is on flood plains along drainageways and streams of the survey area.

The surface layer is friable. The subsoil is dominantly loam and clay loam. Permeability is moderate, available water capacity is high, and the root zone is deep. Unless limed, the soil is medium acid to slightly acid in the root zone. The seasonal high water table is at the surface or within a depth of 1 foot. Depth to bedrock is more than 5 feet. The soil has only medium capacity to store and release plant nutrients for crop use.

Flooding and seasonal wetness are the chief concerns. The soil receives seepage and runoff from higher lying areas. Artificial drainage helps reduce seasonal wetness.

This soil is poorly suited to the commonly grown field crops, hay, and pasture plants. It is better suited to water-tolerant crops, hay, and pasture plants.

CAPABILITY UNIT Vw–1

This unit consists of deep, poorly drained, nearly level to gently sloping soils. These soils are on low terraces and flood plains along drainageways and streams, in depressions, and at the base of slopes.

The surface layer is friable, and the subsoil is dominantly clayey. Permeability is slow to very slow, available water capacity is medium, and the root zone is deep. Unless limed, the soils are extremely acid to moderately alkaline in the root zone. The seasonal high water table is at the surface or within a depth of 1 foot. Depth to bedrock ranges from about 2½ feet to more than 5 feet. The soils have only low to medium capacity to store and release nutrients for plant use.

Flooding and wetness are the chief concerns. The soils receive seepage and runoff from higher lying areas. Artificial drainage is commonly difficult because of the lack of suitable outlets.

These soils are suited to water-tolerant grasses and legumes or to woodland.

CAPABILITY UNIT VIe–1

This unit consists of deep, well-drained, moderately steep soils on uplands. These soils are severely eroded.

The surface layer is dominantly sticky clay loam, and the subsoil is dominantly clayey. Permeability is moderate, available water capacity is medium, and the root zone is deep. Unless limed, the soils are medium acid to very strongly acid in the root zone. Depth to bedrock is commonly about 3½ to more than 5 feet. These soils have only low to medium capacity to store and release nutrients for plant use.

Runoff is rapid. The erosion hazard is very severe where the soils are exposed or where the pasture vegetation is thin. If excessive soil loss continues, tilth deteriorates. As slope increases, controlling erosion becomes more difficult.

These soils are suited to commonly grown hay and pasture plants and to woodland.

CAPABILITY UNIT VIe–2

This unit consists of shallow to deep, well-drained to excessively drained, sloping to moderately steep soils on uplands. Most of these soils are only slightly eroded.

The surface layer is friable and erodible. The soils do not withstand soil losses so well as most other soils on uplands in the survey area. The subsoil ranges from fine sandy loam and loam to clay loam and clay. Permeability is rapid to moderately slow, available water capacity is low, and the root zone is shallow to moderately deep. The soils are very strongly acid to neutral in the root zone. Depth to bedrock ranges from about 1 foot to 5 feet. These soils have only low capacity to store and release nutrients for plant use.

Runoff is medium to rapid. The erosion hazard is very severe where the soils are exposed or where the pasture vegetation is thin. If excessive soil loss continues, tilth deteriorates. The soils are droughty during the growing season.

These soils are suited to drought-resistant hay and pasture plants and to woodland.

CAPABILITY UNIT VIIe–1

This unit consists of shallow to deep, well-drained to excessively drained, moderately steep to steep soils on uplands. Most of the soils are only slightly eroded, but some are severely eroded.

The surface layer is friable and erodible. The soils do not withstand soil loss so well as most other soils on uplands in the survey area. The subsoil ranges from fine sandy loam and loam to clay loam and clay. Permeability is rapid to moderately slow, available water capacity is low, and the root zone is shallow to moderately deep. The soils are very strongly acid to neutral in the root zone. Depth to bedrock ranges from about 1 foot to 5 feet. These soils have only low capacity to store and release nutrients for plant use.

Runoff is rapid. The erosion hazard is very severe where the soils are exposed. The soils are droughty during the growing season.

These soils are suited to drought-resistant pasture plants or to woodland.

Estimated Yields

The soils of the survey area vary a great deal in suitability to crops. Some consistently produce fairly high yields of most cultivated crops. Others, though suitable for crops, produce lower yields. Some are suitable only for less intensive use.

Estimated yields of specified general crops on most soils in the survey area are shown in table 2. These are the estimated average yields, per acre, under improved management.

Under improved management—

1. Contour tillage, stripcropping, terracing, minimum tillage, or similar measures help control erosion, the soils that need drainage are drained, and excess water is disposed of safely.
2. Cropping systems are adequately planned in accordance with the capabilities of the soil and the needs of the farm operator.
3. Manure and crop residue are turned under to supply nitrogen, other nutrients, and organic matter so that tilth is improved and erosion is reduced.
4. Fertilizer and lime are applied according to the needs indicated by soil tests.
5. Tillage is kept to a minimum, but suitable methods of plowing, preparing the seedbed, and cultivating are used.
6. Planting, cultivating, and harvesting are timely and appropriate.
7. Weeds, diseases, and insects are controlled.

The yields shown are not assumed to be the highest yields obtainable, but they set a goal that is practical for most farmers using improved management. Yields on the same soil can be expected to vary because of differences in the kind of management, in the weather, in the crop varieties, and in the number and kinds of insects and diseases.

Woodland [2]

About 67 percent, or 237,560 acres, of the survey area is wooded. Most of the wooded acreage is in second growth hardwoods, loblolly pine (fig. 8), Virginia pine, and shortleaf pine.

The original tree growth consisted of mixed stands of chestnut oak, white oak, post oak, scarlet oak, black oak, northern red oak, southern red oak, and hickory. Yellow-poplar was on the more moist sites. Scattered shortleaf pine and Virginia pine were throughout these hardwood stands. Poorly drained areas were covered by mixed stands of green ash, sweetgum, blackgum, boxelder, and red maple.

Much of the original woodland was cleared and the soils were cultivated as areas were settled and consolidated into farm holdings. The present stands of mixed hardwoods, Virginia pine, loblolly pine, and shortleaf pine are mostly abandoned farmland.

Woodland groups

The soils of the survey area have been assigned to woodland groups to assist owners in planning the use of soils for wood crops. Each group is made up of soils that are suited to the same kinds of trees, that need approximately the same kind of management if the vegetation on them is similar, and that have about the same potential productivity.

Each woodland group is identified by a three-part symbol, such as 1o1, 2w1, or 4c1. The first part of the symbol, always an Arabic number, identifies the potential productivity of the soils in the group for an indicator tree species or forest type, generally the most important adapted species or type on these soils. The number 1 indicates very high potential produc-

[2] By LUITPOLD W. KEMPF, woodland conservationist, Soil Conservation Service.

Figure 8.—**Recently pruned stand of loblolly pine. The soil is Cullen loam, 2 to 6 percent slopes, in woodland group 3o1.**

tivity; 2, high; 3, moderately high; 4, moderate; and 5, low. These ratings are based on field determinations of average site index. Site index is the height, in feet, that the dominant and codominant trees of a given species on a specified kind of soil reach in a natural, essentially unmanaged stand at age 50 years.

The second part of the symbol is a lowercase letter. This letter indicates an important soil property that is associated with a moderate or severe hazard or limitation in managing the soils for wood crops. The letter *w* shows that water in or on the soils, either seasonally or year round, is the chief limitation; *d* shows that root depth is restricted because the soils are shallow to a hardpan, to hard rock, or to other restrictive material; *c* shows that the main limitation is the kind or amount of clay in the upper part of the soils; *s* shows that the soils are sandy and dry, have little or no difference in texture between the surface layer and subsoil, have low moisture-holding capacity, and generally have a low supply of plant nutrients; *r* shows that the main limitation is steep slopes; and *o* shows that the soils have few limitations that restrict their use for trees. Some kinds of soil can have more than one set of subclass characteristics. Priority in placing each kind of soil into a subclass is in the order that the subclass characteristics are listed above.

The last part of the symbol, a second number, indicates differences in soil properties or other factors that affect management and suitability for specified trees.

Table 3 lists each woodland group in the survey area. It shows the potential productivity of the soils in each group and lists the species to be favored in existing stands and in planting. It also shows ratings for (1) erosion hazard, (2) equipment limitations, (3) seedling mortality, (4) windthrow hazard, and (5) plant competition. These ratings are always *slight*, *moderate*, or *severe*. The following explanations of some of the column headings and ratings in table 3 apply to all the woodland groups in the survey area.

Erosion hazard refers to the potential hazard of soil losses in common woodland management operations. The hazard is *slight* if expected soil losses are small; *moderate* if some soil losses are expected and care is needed during logging and construction to reduce the risk of erosion; and *severe* if special methods of operation are necessary for preventing excessive soil losses. In this survey area only steep soils are subject to severe erosion.

Equipment limitations are rated on the basis of soil characteristics that restrict or prohibit the use of equipment commonly used in tending and harvesting

TABLE 2.—*Estimated average yields per acre*

[Absence of data indicates stated crop is not commonly grown or

Map symbol	Mapping unit	Corn	Soybeans	Wheat
		Bu	*Bu*	*Bu*
AbB	Abell fine sandy loam, 0 to 4 percent slopes	115	45	[2] 55
AeB	Abell loam, 0 to 4 percent slopes	120	45	[2] 60
AgB	Appling gravelly sandy loam, 2 to 6 percent slopes	100	35	65
AgC	Appling gravelly sandy loam, 6 to 15 percent slopes	90	30	60
ApB	Appling fine sandy loam, 2 to 6 percent slopes	110	40	70
ApC2	Appling fine sandy loam, 6 to 15 percent slopes, eroded	95	35	65
AwE2	Appling-Wedowee gravelly sandy loams, 15 to 25 percent slopes, eroded			40
AxE2	Appling-Wedowee fine sandy loams, 15 to 25 percent slopes, eroded	70		45
BrD	Bremo loam, 6 to 15 percent slopes	50		30
BrE	Bremo loam, 15 to 25 percent slopes			
BrF	Bremo loam, 25 to 60 percent slopes			
Bu	Buncombe loamy fine sand	60	20	45
CcB2	Cecil fine sandy loam, 2 to 6 percent slopes, eroded	110	40	70
CcC2	Cecil fine sandy loam, 6 to 15 percent slopes, eroded	95	35	60
CcE2	Cecil fine sandy loam, 15 to 25 percent slopes, eroded	70		45
CdC	Cecil cobbly fine sandy loam, 6 to 15 percent slopes	60	20	45
CeB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	70	25	50
CeD3	Cecil clay loam, 6 to 15 percent slopes, severely eroded	60	20	40
CeE3	Cecil clay loam, 15 to 25 percent slopes, severely eroded			
Ch	Chewacla loam	95	40	[2] 50
CT	Chewacla-Toccoa complex	110	40	[2] 60
CuB	Cullen loam, 2 to 6 percent slopes	120	45	75
CuC2	Cullen loam, 6 to 15 percent slopes, eroded	110	40	70
CuE2	Cullen loam, 15 to 25 percent slopes, eroded	75		50
CxB3	Cullen clay loam, 2 to 6 percent slopes, severely eroded	95	35	60
CxC3	Cullen clay loam, 6 to 15 percent slopes, severely eroded	80	30	50
CxE3	Cullen clay loam, 15 to 25 percent slopes, severely eroded			
DoA	Dogue fine sandy loam, 0 to 2 percent slopes	115	40	[2] 55
DoB	Dogue fine sandy loam, 2 to 6 percent slopes	110	40	65
Eb	Elbert loam			
EnB	Enon fine sandy loam, 2 to 6 percent slopes	80	30	65
EnC2	Enon fine sandy loam, 6 to 10 percent slopes, eroded	75	25	60
FlB2	Fluvanna fine sandy loam, 2 to 6 percent slopes, eroded	110	35	70
FlC2	Fluvanna fine sandy loam, 6 to 15 percent slopes, eroded	100	30	60
FlE2	Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded	70		45
Fo	Forestdale silt loam			
GeB2	Georgeville loam, 2 to 6 percent slopes, eroded	105	40	65
GeC2	Georgeville loam, 6 to 15 percent slopes, eroded	90	30	55
GeE2	Georgeville loam, 15 to 25 percent slopes, eroded	65		40
GrB	Georgeville-Brockroad loams, 2 to 6 percent slopes	110	45	70
GwB	Gwinnett clay loam, thick solum variant, 2 to 6 percent slopes	75	25	50
GwC	Gwinnett clay loam, thick solum variant, 6 to 15 percent slopes	65	20	40
HaB	Helena fine sandy loam, 2 to 6 percent slopes	75	25	60
HaC	Helena fine sandy loam, 6 to 15 percent slopes	65	20	55
HdB	Herndon loam, 2 to 6 percent slopes	95	35	60
HdC	Herndon loam, 6 to 10 percent slopes	85	30	55
HwB2	Hiwassee loam, 2 to 6 percent slopes, eroded	125	45	75
HwC2	Hiwassee loam, 6 to 15 percent slopes, eroded	90	40	70
HwE2	Hiwassee loam, 15 to 25 percent slopes, eroded	75		50
IrB	Iredell loam, 2 to 6 percent slopes	60	25	50
IrB2	Iredell loam, 2 to 6 percent slopes, eroded	50	20	50
IrC	Iredell loam, 6 to 10 percent slopes	40	25	45
IrC2	Iredell loam, 6 to 10 percent slopes, eroded	35	20	40
LoD	Louisburg fine sandy loam, 6 to 15 percent slopes	45		30
LoE	Louisburg fine sandy loam, 15 to 25 percent slopes			
LoF	Louisburg fine sandy loam, 25 to 60 percent slopes			
MaB2	Madison loam, 2 to 6 percent slopes, eroded	100	40	70
MaC2	Madison loam, 6 to 15 percent slopes, eroded	90	35	55
MaE2	Madison loam, 15 to 25 percent slopes, eroded	70		45
McD	Manteo channery loam, 6 to 15 percent slopes			
McE	Manteo channery loam, 15 to 25 percent slopes			
MpB	Masada fine sandy loam, 2 to 6 percent slopes	110	40	70
MpC	Masada fine sandy loam, 6 to 15 percent slopes	95	35	65
MrB	Masada gravelly fine sandy loam, 2 to 6 percent slopes	100	35	65
MrC	Masada gravelly fine sandy loam, 6 to 10 percent slopes	90	30	60
MsB2	Masada loam, 2 to 6 percent slopes, eroded	115	45	75
MsC2	Masada loam, 6 to 12 percent slopes, eroded	110	40	70

of principal crops under improved management

is not suited to the specified soil. Only arable soils are listed]

Barley	Oats	Hay			Tall grass-legume, pasture	Bright tobacco	Dark tobacco
		Alfalfa	Red clover	Mixed hay			
Bu	*Bu*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Lbs*	*Lbs*
[2] 35	[2] 65	[3] 4.0	3.0	3.2	240	2,500	2,100
[2] 40	[2] 65	[3] 4.2	3.0	3.2	240		2,150
55	70	3.8	3.0	3.0	200	2,300	1,900
50	65	3.5	2.5	2.5	185	2,100	1,750
60	75	4.0	3.2	3.0	210	2,500	2,000
55	70	3.5	2.8	2.6	195	2,300	1,850
35	50	2.4	1.2	1.2	180	1,800	1,550
45	55	2.8	1.4	1.4	175	2,000	1,650
35	50	1.8	1.5	1.5	130		1,200
				1.4	95		
					60		
35	55			2.0	120	1,700	
70	80	4.0	3.2	3.0	210	[4] 2,400	2,000
65	70	3.5	3.0	2.8	200	[4] 2,250	1,900
50	60	2.8	1.6	1.4	190	[4] 1,950	1,700
45	55	3.0	2.2	2.0	150		1,450
50	70	3.2	2.4	2.2	165		1,900
45	60	3.0	2.0	2.0	150		1,800
				1.8	125		
[2] 40	[2] 75		3.0	3.5	225		
[2] 40	[2] 75	3.5	3.0	3.5	240		
75	80	4.5	3.5	3.2	240		2,150
70	75	4.2	3.2	3.0	210		1,850
55	60	3.2	2.0	2.0	190		1,850
60	65	4.0	2.8	2.4	180		1,950
50	65	3.2	2.4	2.2	160		1,850
				2.0	140		
[2] 40	[2] 70	[3] 3.5	3.0	3.5	230	2,100	2,050
65	70	[3] 3.0	3.0	3.5	220	2,200	2,100
					180		
65	70	3.5	3.0	3.0	200		1,900
60	65	3.0	2.6	2.4	180		1,750
65	70	3.8	3.0	3.0	240	[4] 2,100	1,850
60	65	3.6	2.8	3.0	240	[4] 1,950	1,750
50	60	2.8	1.6	1.4	185	[4] 1,650	1,550
					180		
65	75	3.4	3.0	2.6	205	[4] 2,300	1,950
60	65	3.2	3.0	2.4	180	[4] 2,150	1,850
45	50	2.4	1.4	1.4	175	[4] 1,850	1,650
70	80	3.6	3.2	2.8	215	[4] 2,350	2,000
50	60	3.6	2.4	2.2	180		2,200
45	50	3.2	2.0	2.0	160		2,100
60	65		2.2	2.5	175	[4] 2,000	
55	60		2.0	2.0	155	[4] 1,800	
65	75	4.0	3.0	3.0	200	2,100	
55	65	3.8	2.8	3.0	190	2,000	
80	80	5.0	3.6	3.4	250		2,200
75	75	4.5	3.2	3.0	220		2,100
55	60	3.0	2.0	2.0	195		1,900
50	60		2.0	2.5	200		
45	60		1.5	2.0	180		
45	50		2.0	2.2	190		
40	35		1.5	2.0	170		
35	60	1.6	1.2	1.2	90	1,750	
				1.2	80		
					45		
70	85	4.0	3.0	3.0	200	[4] 2,000	1,900
60	65	3.2	3.0	2.6	190	[4] 1,850	1,800
50	60	2.8	1.6	1.4	180	[4] 1,550	1,600
					75		
					40		
60	70	4.0	3.2	3.0	200	2,500	2,000
55	70	3.5	2.8	2.6	190	2,350	1,900
55	65	3.4	3.0	2.8	185	2,400	1,900
50	60	3.2	2.6	2.4	190	2,300	1,850
65	75	4.2	3.4	3.2	210		2,000
60	70	4.0	3.2	3.2	200		1,900

TABLE 2.—*Estimated average yields per acre*

Map symbol	Mapping unit	Corn	Soybeans	Wheat
		Bu	*Bu*	*Bu*
MtB	Masada loam, local alluvium, 0 to 4 percent slopes	140	45	[3] 80
MwB	Mayodan fine sandy loam, 2 to 6 percent slopes	105	35	60
MwC	Mayodan fine sandy loam, 6 to 15 percent slopes	90	30	60
MyB2	Mayodan loam, 2 to 6 percent slopes, eroded	110	40	65
MyC2	Mayodan loam, 6 to 15 percent slopes, eroded	95	35	65
MzB2	Mecklenburg loam, 2 to 6 percent slopes, eroded	85	40	70
MzC2	Mecklenburg loam, 6 to 15 percent slopes, eroded	80	30	65
MzE2	Mecklenburg loam, 15 to 25 percent slopes, eroded	65	----	40
NaB	Nason loam, 2 to 6 percent slopes	90	30	50
NaC	Nason loam, 6 to 15 percent slopes	85	30	45
NaE	Nason loam, 15 to 25 percent slopes	65	----	35
PeA	Penn silt loam, 0 to 2 percent slopes	75	30	50
PeB	Penn silt loam, 2 to 6 percent slopes	70	25	45
PeC	Penn silt loam, 6 to 15 percent slopes	65	20	40
PkB	Pinkston fine sandy loam, 2 to 6 percent slopes	80	35	35
PkD	Pinkston fine sandy loam, 6 to 15 percent slopes	65	----	30
PpE	Pinkston and Penn soils, 15 to 25 percent slopes	----	----	----
Re	Riverview loam	140	45	[3] 80
Ro	Roanoke silt loam, local alluvium	----	----	----
StA	State fine sandy loam, 0 to 2 percent slopes	140	45	[3] 80
StB	State fine sandy loam, 2 to 6 percent slopes	140	45	80
TaD	Tallapoosa loam, 6 to 15 percent slopes	45	----	30
TaE	Tallapoosa loam, 15 to 25 percent slopes	----	----	----
TaF	Tallapoosa loam, 25 to 60 percent slopes	----	----	----
TlB	Tatum loam, 2 to 6 percent slopes	90	30	50
TlC2	Tatum loam, 6 to 15 percent slopes, eroded	85	30	45
TlE2	Tatum loam, 15 to 25 percent slopes, eroded	65	----	35
TmD3	Tatum clay loam, 6 to 15 percent slopes, severely eroded	50	20	25
TmE3	Tatum clay loam, 15 to 25 percent slopes, severely eroded	----	----	----
To	Toccoa fine sandy loam	120	45	75
TuB	Turbeville fine sandy loam, 2 to 6 percent slopes	120	45	75
TuC2	Turbeville fine sandy loam, 6 to 15 percent slopes, eroded	100	40	65
VaB	Vance fine sandy loam, 2 to 6 percent slopes	85	30	50
VaB2	Vance fine sandy loam, 2 to 6 percent slopes, eroded	80	25	45
VaC2	Vance fine sandy loam, 6 to 10 percent slopes, eroded	75	20	45
Wa	Wahee and Augusta loams	85	35	[3] 45
Wd	Wehadkee loam	60	25	----
WeA	White Store fine sandy loam, 0 to 2 percent slopes	70	30	45
WeB	White Store fine sandy loam, 2 to 6 percent slopes	70	25	45
WgA	White Store loam, 0 to 2 percent slopes	70	30	50
WgB	White Store loam, 2 to 6 percent slopes	70	25	50
WhA	White Store loam, wet variant, 0 to 2 percent slopes	70	25	[3] 50
WhB	White Store loam, wet variant, 2 to 6 percent slopes	65	20	40
WkB	Wilkes loam, 2 to 6 percent slopes	70	25	45
WkD	Wilkes loam, 6 to 15 percent slopes	60	20	35
WkE	Wilkes loam, 15 to 25 percent slopes	----	----	----
WkF	Wilkes loam, 25 to 60 percent slopes	----	----	----
WlE3	Wilkes soils, 15 to 25 percent slopes, severely eroded	----	----	----
WoB	Worsham soils, 0 to 4 percent slopes	----	----	----

[1] A term used to express the carrying capacity of pasture. It is the number of animal units carried per acre multiplied by vides 30 days of grazing for two cows has a carrying capacity of 60 cow-acre-days.
[3] Small grain lodges on this soil.
[5] Alfalfa is short lived on this soil.
[6] Lower quality.

trees. Soil characteristics having the most limiting effect are drainage, depth to the water table, slope, and texture of the surface layer. A *slight* rating means that there is no restriction in the kind of equipment or the time of year it is used; *moderate* means that use of equipment is restricted for less than 3 months of the year; and *severe* means that special equipment is needed and use is restricted for more than 3 months of the year.

Seedling mortality refers to the expected degree of mortality of planted seedlings as influenced by kinds of soil. Plant competition is not considered a limiting factor. Considered in the ratings are depth to the water table, hazard of flooding, drainage, soil depth and structure, and degree of erosion. Normal rainfall, good planting stock, and proper planting are assumed. A rating of *slight* indicates an expected loss of less than 25 percent of the planted seedlings; *moderate*, a loss of 25 to 50 percent; and *severe*, a loss of more than 50 percent. Special preparation of the site is needed

of principal crops under improved management—Con.

Barley	Oats	Hay			Tall grass-legume, pasture	Bright tobacco	Dark tobacco
		Alfalfa	Red clover	Mixed hay			
Bu	*Bu*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Lbs*	*Lbs*
[2] 70	[2] 80	4.5	4.5	4.5	280		2,200
65	65	3.0	3.0	2.8	195	2,400	1,950
50	60	3.2	2.6	2.4	185	2,250	1,850
65	75	4.2	3.4	3.2	210		2,000
55	65	3.4	2.8	2.6	190		1,850
65	70	3.5	3.5	3.5	210		2,100
60	65	3.0	2.8	2.8	200		1,900
45	50	2.2	2.0	2.0	195		1,700
65	70	3.2	2.8	3.0	270	2,050	
60	65	2.6	2.4	2.5	240	1,900	
40	60	2.1	1.4	2.5	225	1,600	
60	65	2.8	2.2	2.6	225		
60	60	2.6	2.0	2.4	190		
50	50	2.0	2.0	2.0	170		
50	80	2.4	2.5	3.0	150	1,800	
40	65	2.0	1.4	1.6	120	1,700	
				1.8	90		
[2] 70	[2] 80	4.5	3.5	4.0	280		2,000
					155		
[2] 70	[2] 80	4.2	4.0	4.0	285	2,250	2,100
80	80	4.6	3.6	4.0	285	2,300	2,150
35	50	1.8	1.4	1.5	120		
				1.4	95		
					60		
65	70	3.5	3.2	3.0	240		2,000
60	65	3.0	2.4	2.5	225		1,800
45	60	2.4	2.2	2.0	210		1,600
45	60	2.6	2.0	1.5	195		1,700
					135		
70	80	4.2	4.0	4.0	240	[1] 2,100	1,800
70	80	4.4	3.4	3.2	220	[1] 2,500	2,150
65	70	4.0	3.0	3.0	200	[1] 2,300	2,000
65	70	3.0	3.0	2.8	210	2,100	1,700
55	60	2.8	2.8	2.6	195	1,950	1,550
50	55	2.6	2.0	2.0	180	1,850	1,500
[2] 50	[2] 70		2.5	2.5	210		
			2.4	2.4	200		
50	70		2.5	2.6	190	2,100	
50	70		2.4	2.6	180	2,200	
60	70		2.6	2.6	180		
60	70		2.5	2.6	190		
[2] 60	[2] 70		2.0	2.4	170		
50	60		1.8	2.0	170		
50	70	2.4	2.2	2.0	170	[1] 1,600	1,300
40	60	2.0	1.8	1.6	130	[1] 1,450	1,200
				1.4	95		
					50		
					50		
					150		

[1] the number of days the pasture is grazed during a single grazing season without injury to the sod. An acre of pasture that pro-

before planting for soils rated severe and for most soils rated moderate.

Windthrow hazard is rated according to the ability of the soil to hold trees firmly. Soil characteristics that affect the growth of tree roots are considered in the ratings. The hazard is *slight* if most trees withstand wind; *moderate* if some trees are blown down during periods of excessive soil wetness and strong wind; and *severe* if many trees are blown down during periods of excessive soil wetness and moderate or strong wind.

Plant competition is rated on the basis of the degree to which unwanted plants can invade an area if openings are made in the tree canopy. Considered in the ratings are available water capacity, fertility, drainage, and degree of erosion. A rating of *slight* means that competition from other plants is not expected to be a problem; *moderate*, that plant competition generally is not expected to prevent development of fully stocked stands of desirable trees; and *severe*, that expected plant competition can prevent establishment of

TABLE 3.—*Wood crops and*

[No data for Cut and fill land; Quarry, mine;

Woodland groups and map symbols	Potential productivity		Species to be
	Species	Estimated site index	Existing stands
Group 1w1: Deep, somewhat poorly drained soils on flood plains; high available water capacity; slopes of 0 to 2 percent. Ch, CT. For Toccoa part of CT, see group 1o1.	Northern red oak White oak Loblolly pine	85+ 85+ 95+	Northern red oak, white oak, loblolly pine, yellow-poplar.
Group 1w2: Deep, poorly drained soils on flood plains and low terraces; medium to high available water capacity; slopes of 0 to 2 percent. Fo, Ro, Wd.	Loblolly pine Willow oak Virginia pine	95+ 85+ 65–75	Loblolly pine, willow oak, Virginia pine, green ash.
Group 1o1: Deep, well-drained soils on flood plains and terraces; medium to high available water capacity; slopes of 0 to 6 percent. Re, StA, StB, To.	Northern red oak White oak Loblolly pine Yellow-poplar Virginia pine	85+ 85+ 95+ 95+ 85+	Loblolly pine, northern red oak, white oak, yellow-poplar, Virginia pine, black walnut.
Group 2w1: Deep to moderately deep, somewhat poorly drained soils on flood plains and low-lying uplands; medium to low available water capacity; slopes of 0 to 6 percent. Wa, WhA, WhB.	Northern red oak White oak Loblolly pine Virginia pine	75–85 75–85 85–95 65–75	Northern red oak, white oak, loblolly pine, Virginia pine.
Group 2w2: Deep, moderately well drained soils on terraces; medium available water capacity; slopes of 0 to 6 percent. DoA, DoB.	Loblolly pine Southern red oak White oak Sweetgum	85–95 65–75 65–75 85–95	Loblolly pine, southern red oak, white oak, sweetgum.
Group 2w3: Deep, poorly drained soil in low-lying areas; medium available water capacity; slopes of 0 to 4 percent. WoB.	Northern red oak Shortleaf pine Virginia pine Loblolly pine Pin oak	75–85 60–70 65–75 75–85 80–90	Northern red oak, shortleaf pine, Virginia pine, loblolly pine, pin oak.
Group 2s1: Deep, excessively drained soil on flood plains; low available water capacity; slopes of 0 to 4 percent. Bu.	Loblolly pine Northern red oak White oak Yellow-poplar	85–95 75–85 75–85 95+	Loblolly pine, northern red oak, white oak, yellow-poplar, Virginia pine, shortleaf pine.
Group 2o1: Deep, well drained to moderately well-drained soils in low-lying areas; medium available water capacity; slopes of 0 to 4 percent. AbB, AeB, MtB.	Northern red oak Yellow-poplar Loblolly pine Virginia pine	75–85 85–95 85–95 65–75	Northern red oak, white oak, yellow-poplar, loblolly pine, black walnut, shortleaf pine, Virginia pine.
Group 3w1: Deep, moderately well-drained soils on uplands; medium available water capacity; slopes of 2 to 15 percent. HaB, HaC.	Loblolly pine Shortleaf pine Northern red oak White oak	75–85 60–70 60–70 60–70	Loblolly pine, shortleaf pine, northern red oak, white oak.
Group 3d1: Moderately deep, somewhat excessively drained soil on uplands; low available water capacity; slopes of 6 to 15 percent. BrD.	Loblolly pine Northern red oak White oak Virginia pine	75–85 65–75 65–75 65–75	Northern red oak, loblolly pine, white oak, Virginia pine, shortleaf pine.
Group 3d2: Moderately deep, somewhat excessively drained soils on uplands; low available water capacity; slopes of 15 to 60 percent. BrE, BrF.	Loblolly pine Northern red oak White oak Virginia pine	75–85 65–75 65–75 65–75	Northern red oak, loblolly pine, white oak, Virginia pine, shortleaf pine.
Group 3r1: Deep, well-drained soils on uplands; medium available water capacity; slopes of 15 to 25 percent. AwE2, AxE2, CcE2, CuE2, FlE2, GeE2, HwE2, MaE2, NaE, TlE2.	Loblolly pine Northern red oak White oak Virginia pine	75–85 65–75 65–75 65–75	Loblolly pine, Virginia pine, white oak, northern red oak, yellow-poplar.
Group 3r2: Moderately deep, somewhat excessively drained to excessively drained soils on uplands; low available water capacity; slopes of 5 to 60 percent. LoE, LoF.	Northern red oak White oak Virginia pine Shortleaf pine	65–75 65–75 60–70 50–60	Northern red oak, white oak, Virginia pine.

management by woodland groups

and Urban land. Material too variable]

favored in—	Erosion hazard	Equipment limitations	Seedling mortality	Windthrow hazard	Plant competition	
Planting					Conifers	Hardwood
Loblolly pine	Slight	Moderate	Slight	Slight	Severe	Severe.
Loblolly pine	Slight	Severe	Severe	Slight	Severe	Severe.
Loblolly pine, black walnut.	Slight	Slight	Slight to moderate.	Slight	Severe	Moderate.
Loblolly pine	Slight	Moderate	Moderate	Moderate	Severe	Severe.
Loblolly pine	Slight	Moderate	Slight	Slight	Severe	Moderate.
Loblolly pine, Virginia pine.	Slight	Severe	Severe	Slight	Severe	Severe.
Loblolly pine	Slight	Moderate	Moderate	Slight	Moderate	Slight.
Loblolly pine, yellow-poplar, black walnut.	Slight	Slight	Slight	Slight	Severe	Moderate.
Loblolly pine	Slight	Slight	Slight	Slight	Moderate	Moderate.
Loblolly pine, Virginia pine.	Slight	Slight	Moderate	Moderate	Moderate	Slight.
Loblolly pine, Virginia pine.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Moderate	Moderate	Moderate	Slight.
Loblolly pine	Moderate	Moderate	Slight	Slight	Moderate	Slight.
Loblolly pine, Virginia pine, shortleaf pine.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Slight	Slight	Moderate	Slight.

TABLE 3.—*Wood crops and*

Woodland groups and map symbols	Potential productivity		Species to be
	Species	Estimated site index	Existing stands
Group 3o1: Deep, well-drained soils on uplands and terraces; medium available water capacity; slopes of 2 to 15 percent. AgB, AgC, ApB, ApC2, CcB2, CcC2, CdC, CuB, CuC2, FlB2, FlC2, GeB2, GeC2, Grb, GwB, GwC, HdB, HdC, HwB2, HwC2, MaB2, MaC2, MpB, MpC, MrB, MrC, MsB2, MsC2, MwB, MwC, MyB2, MyC2, NaB, NaC, TlB, TlC2, TuB, TuC2, VaB, VaB2, VaC2.	Loblolly pine Northern red oak White oak Virginia pine	75–85 65–75 65–75 70–80	Loblolly pine, Northern red oak, sweetgum, Virginia pine.
Group 3o2: Moderately deep, well-drained to excessively drained soils on uplands; low available water capacity; slopes of 0 to 15 percent. LoD, PeA, PeB, PeC.	Northern red oak White oak Virginia pine Shortleaf pine	65–75 65–75 60–70 50–60	Virginia pine, northern red oak, white oak, shortleaf pine.
Group 4w1: Deep, poorly drained soil in low-lying areas; medium available water capacity; slopes of 0 to 4 percent. Eb.	Northern red oak White oak Loblolly pine Virginia pine Pin oak	55–65 55–65 65–75 55–65 55–65	Loblolly pine, Virginia pine
Group 4w2: Deep, moderately well drained to somewhat poorly drained soils on uplands; medium available water capacity; slopes of 2 to 10 percent. IrB, IrB2, IrC, IrC2.	Loblolly pine Shortleaf pine White oak Northern red oak Virginia pine	65–75 55–65 45–55 45–55 55–65	Loblolly pine, Virginia pine
Group 4d1: Shallow to moderately deep, well drained to excessively drained soils on uplands; low available water capacity; slopes of 2 to 15 percent. McD, PkB, PkD.	Northern red oak White oak Virginia pine Shortleaf pine Loblolly pine	55–65 55–65 55–65 55–65 65–75	Shortleaf pine, Virginia pine, northern red oak, white oak, loblolly pine.
Group 4d2: Shallow, somewhat excessively drained soils on uplands; low available water capacity; slopes of 15 to 60 percent. McE, McF.	Northern red oak White oak Virginia pine Shortleaf pine Loblolly pine	55–65 55–65 55–65 55–65 65–75	Shortleaf pine, Virginia pine, northern red oak, white oak, loblolly pine.
Group 4c1: Deep, well-drained soils on uplands; medium available water capacity; slopes of 2 to 15 percent. CeB3, CeD3, CxB3, CxC3, TmD3.	Loblolly pine Northern red oak White oak	65–75 55–65 55–65	Loblolly pine, Virginia pine
Group 4c2: Deep, well-drained soils on uplands; medium available water capacity; slopes of 15 to 25 percent. CeE3, CxE3, TmE3.	Northern red oak White oak Virginia pine Loblolly pine	55–65 55–65 55–65 65–75	Northern red oak, white oak, Virginia pine, loblolly pine.
Group 4c3: Deep, moderately well drained soils on uplands; low available water capacity; slopes of 0 to 6 percent. WeA, WeB, WgA, WgB.	Loblolly pine Virginia pine	70–80 60–70	Loblolly pine, Virginia pine
Group 4r1: Moderately deep to deep, well drained to excessively drained soils on uplands; low available water capacity; slopes of 15 to 60 percent. PpE, TaE, TaF.	Northern red oak White oak Virginia pine	55–65 55–65 55–65	Northern red oak, white oak, Virginia pine, loblolly pine.
Group 4r2: Moderately deep to deep, well-drained soils on uplands; low to medium available water capacity; slopes of 15 to 60 percent. MzE2, WkE, WkF, WlE3.	Northern red oak White oak Shortleaf pine Virginia pine	55–65 55–65 55–65 55–65	Northern red oak, white oak, loblolly pine, Virginia pine.
Group 4o1: Moderately deep to deep, well-drained soils on uplands; low available water capacity; slopes of 2 to 15 percent. TaD, WkB, WkD.	Northern red oak White oak Shortleaf pine Virginia pine	55–65 55–65 55–65 55–65	Northern red oak, white oak, loblolly pine, Virginia pine.

management by woodland groups—Con.

favored in—	Erosion hazard	Equipment limitations	Seedling mortality	Windthrow hazard	Plant competition	
Planting					Conifers	Hardwood
Loblolly pine	Slight	Slight	Slight	Slight	Moderate	Slight.
Loblolly pine, Virginia pine, shortleaf pine.	Slight	Slight	Slight	Slight	Moderate	Slight.
Loblolly pine, Virginia pine.	Slight	Severe	Severe	Moderate	Severe	Severe.
Loblolly pine, Virginia pine.	Slight	Moderate	Moderate	Slight	Moderate	Moderate.
Loblolly pine	Slight	Slight	Severe	Moderate	Slight	Slight.
Loblolly pine	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Severe	Moderate	Slight	Slight.
Loblolly pine	Moderate	Moderate	Moderate	Moderate	Slight	Slight.
Loblolly pine, Virginia pine.	Severe	Severe	Slight	Slight	Slight	Slight.
Loblolly pine, Virginia pine.	Slight	Moderate	Moderate	Moderate	Slight	Slight.
Virginia pine, loblolly pine.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Severe	Moderate	Slight	Slight.
Loblolly pine, Virginia pine.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Moderate if slope is 15 to 35 percent, severe if more than 35 percent.	Slight	Slight	Slight	Slight.
Loblolly pine, Virginia pine.	Slight	Slight	Slight	Slight	Slight	Slight.

TABLE 3.—*Wood crops and*

Woodland groups and map symbols	Potential productivity		Species to be
	Species	Estimated site index	Existing stands
Group 4o2: Deep, well-drained soils on uplands; medium available water capacity; slopes of 2 to 15 percent. EnB, EnC2, MzB2, MzC2.	Northern red oak White oak Virginia pine Shortleaf pine Loblolly pine	65–75 65–75 65–75 65–75 75–85	Northern red oak, white oak, Virginia pine, shortleaf pine, loblolly pine.
Group 5d1: Shallow, somewhat excessively drained soil on uplands; low available water capacity; slopes of 25 to 60 percent. MNE.	Northern red oak White oak Virginia pine	45–55 45–55 45–55	Northern red oak, white oak, Virginia pine.

a desirable stand unless intensive site preparation and such practices as weeding are used to control undesirable plants.

Wildlife [3]

The wildlife population of any area depends mainly on the availability of food, cover, and water in a suitable combination. The lack of any of these requirements, an unfavorable balance between them, or an inadequate distribution of them can seriously limit or make impossible the use of a tract as a habitat for desired species of wildlife.

Most wildlife habitats are created, improved, or maintained by establishing and manipulating vegetation and by providing food and water in suitable places. Information about the soils is essential and is

[3] By R. F. DUGAN, biologist, Soil Conservation Service.

TABLE 4.—*Suitability of soils for*

[No data for Cut and fill land; Quarry, mine;

Map symbols	Mapping units	Elements of		
		Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants
AbB	Abell fine sandy loam, 0 to 4 percent slopes	Good	Good	Good
AeB	Abell loam, 0 to 4 percent slopes	Good	Good	Good
AgB	Appling gravelly sandy loam, 2 to 6 percent slopes	Good	Good	Good
AgC	Appling gravelly sandy loam, 6 to 15 percent slopes	Fair	Good	Good
ApB	Appling fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
ApC2	Appling fine sandy loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
AwE2	Appling-Wedowee gravelly sandy loams, 15 to 25 percent slopes, eroded	Poor	Fair	Good
AxE2	Appling-Wedowee fine sandy loams, 15 to 25 percent slopes, eroded	Poor	Fair	Good
BrD	Bremo loam, 6 to 15 percent slopes	Fair	Fair	Fair
BrE	Bremo loam, 15 to 25 percent slopes	Poor	Fair	Fair
BrF	Bremo loam, 25 to 60 percent slopes	Very poor	Poor	Fair
Bu	Buncombe loamy fine sand	Poor	Poor	Fair
CcB2	Cecil fine sandy loam, 2 to 6 percent slopes, eroded	Good	Good	Good
CcC2	Cecil fine sandy loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
CcE2	Cecil fine sandy loam, 15 to 25 percent slopes, eroded	Poor	Fair	Good
CdC	Cecil cobbly fine sandy loam, 6 to 15 percent slopes	Fair	Good	Good
CeB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	Good	Good	Good
CeD3	Cecil clay loam, 6 to 15 percent slopes, severely eroded	Fair	Good	Good
CeE3	Cecil clay loam, 15 to 25 percent slopes, severely eroded	Poor	Fair	Good
Ch	Chewacla loam	Poor	Fair	Fair
CT	Chewacla-Toccoa complex	Poor	Fair	Fair
CuB	Cullen loam, 2 to 6 percent slopes	Good	Good	Good
CuC2	Cullen loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
CuE2	Cullen loam, 15 to 25 percent slopes, eroded	Poor	Fair	Good
CxB3	Cullen clay loam, 2 to 6 percent slopes, severely eroded	Good	Good	Good
CxC3	Cullen clay loam, 6 to 15 percent slopes, severely eroded	Fair	Good	Good

management by woodland groups—Con.

favored in—					Plant competition	
Planting	Erosion hazard	Equipment limitations	Seedling mortality	Windthrow hazard	Conifers	Hardwood
Loblolly pine, Virginia pine.	Slight	Slight	Slight	Slight	Slight	Slight to moderate.
Virginia pine, loblolly pine.	Slight	Severe	Severe	Moderate	Slight	Slight.

also useful in broad-scale planning parks, nature areas, or other recreational or educational developments in which wildlife populations are important. It is an important aid in planning the acquisition of land for development of wildlife habitat or protection of wildlife.

Interpretations of the suitability of soils for wildlife are helpful in selecting sites that can be managed as wildlife habitat and in determining the level of management needed for satisfactory results. Interpretations can also reveal specific factors that make a particular area unsuited to a specified kind of wildlife. Table 4 shows the suitability ratings of the soils of the survey area for seven elements of wildlife habitat and for three kinds of wildlife habitat.

Soils are rated for their suitability for producing various kinds of wildlife habitat—openland wildlife habitat, woodland wildlife habitat, and wetland wild-

wildlife habitat and kinds of wildlife

and Urban land. Material too variable]

wildlife habitat				Kinds of wildlife		
Hardwood trees	Coniferous trees	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Fair	Fair	Fair	Good	Fair.
Good	Good	Fair	Fair	Fair	Good	Fair.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.

TABLE 4.—*Suitability of soils for*

Map symbols	Mapping units	Elements of		
		Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants
CxE3	Cullen clay loam, 15 to 25 percent slopes, severely eroded	Poor	Fair	Good
DoA	Dogue fine sandy loam, 0 to 2 percent slopes	Good	Good	Good
DoB	Dogue fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
Eb	Elbert loam	Poor	Fair	Fair
EnB	Enon fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
EnC2	Enon fine sandy loam, 6 to 10 percent slopes, eroded	Fair	Good	Good
FlB2	Fluvanna fine sandy loam, 2 to 6 percent slopes, eroded	Good	Good	Good
FlC2	Fluvanna fine sandy loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
FlE2	Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded	Poor	Fair	Good
Fo	Forestdale silt loam	Poor	Fair	Fair
GeB2	Georgeville loam, 2 to 6 percent slopes, eroded	Good	Good	Good
GeC2	Georgeville loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
GeE2	Georgeville loam, 15 to 25 percent slopes, eroded	Poor	Fair	Good
GrB	Georgeville-Brockroad loams, 2 to 6 percent slopes	Good	Good	Good
GwB	Gwinnett clay loam, thick solum variant, 2 to 6 percent slopes	Good	Good	Good
GwC	Gwinnett clay loam, thick solum variant, 6 to 15 percent slopes	Fair	Good	Good
HaB	Helena fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
HaC	Helena fine sandy loam, 6 to 15 percent slopes	Fair	Good	Good
HdB	Herndon loam, 2 to 6 percent slopes	Good	Good	Good
HdC	Herndon loam, 6 to 10 percent slopes	Fair	Good	Good
HwB2	Hiwassee loam, 2 to 6 percent slopes, eroded	Good	Good	Good
HwC2	Hiwassee loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
HwE2	Hiwassee loam, 15 to 25 percent slopes, eroded	Poor	Fair	Good
IrB	Iredell loam, 2 to 6 percent slopes	Fair	Good	Good
IrB2	Iredell loam, 2 to 6 percent slopes, eroded	Fair	Good	Good
IrC	Iredell loam, 6 to 10 percent slopes	Fair	Good	Good
IrC2	Iredell loam, 6 to 10 percent slopes, eroded	Fair	Good	Good
LoD	Louisburg fine sandy loam, 6 to 15 percent slopes	Fair	Fair	Fair
LoE	Louisburg fine sandy loam, 15 to 25 percent slopes	Poor	Fair	Fair
LoF	Louisburg fine sandy loam, 25 to 60 percent slopes	Very poor	Poor	Fair
MaB2	Madison loam, 2 to 6 percent slopes, eroded	Good	Good	Good
MaC2	Madison loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
MaE2	Madison loam, 15 to 25 percent slopes, eroded	Poor	Fair	Good
McD	Manteo channery loam, 6 to 15 percent slopes	Very poor	Poor	Poor
McE	Manteo channery loam, 15 to 25 percent slopes	Very poor	Poor	Poor
McF	Manteo channery loam, 25 to 60 percent slopes	Very poor	Very poor	Poor
MNE	Manteo-Rock outcrop complex, steep	Very poor	Very poor	Poor
MpB	Masada fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
MpC	Masada fine sandy loam, 6 to 15 percent slopes	Fair	Good	Good
MrB	Masada gravelly fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
MrC	Masada gravelly fine sandy loam, 6 to 10 percent slopes	Fair	Good	Good
MsB2	Masada loam, 2 to 6 percent slopes, eroded	Good	Good	Good
MsC2	Masada loam, 6 to 12 percent slopes, eroded	Fair	Good	Good
MtB	Masada loam, local alluvium, 0 to 4 percent slopes	Good	Good	Good
MwB	Mayodan fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
MwC	Mayodan fine sandy loam, 6 to 15 percent slopes	Fair	Good	Good
MyB2	Mayodan loam, 2 to 6 percent slopes, eroded	Good	Good	Good
MyC2	Mayodan loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
MzB2	Mecklenburg loam, 2 to 6 percent slopes, eroded	Good	Good	Good
MzC2	Mecklenburg loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
MzE2	Mecklenburg loam, 15 to 25 percent slopes, eroded	Poor	Fair	Good
NaB	Nason loam, 2 to 6 percent slopes	Fair	Good	Good
NaC	Nason loam, 6 to 15 percent slopes	Fair	Good	Good
NaE	Nason loam, 15 to 25 percent slopes	Poor	Fair	Good
PeA	Penn silt loam, 0 to 2 percent slopes	Fair	Good	Good
PeB	Penn silt loam, 2 to 6 percent slopes	Fair	Good	Good
PeC	Penn silt loam, 6 to 15 percent slopes	Fair	Good	Good
PkB	Pinkston fine sandy loam, 2 to 6 percent slopes	Fair	Good	Good
PkD	Pinkston fine sandy loam, 6 to 15 percent slopes	Fair	Good	Good
PpE	Pinkston and Penn soils, 15 to 25 percent slopes	Poor	Fair	Good
Re	Riverview loam	Poor	Fair	Fair
Ro	Roanoke silt loam, local alluvium	Poor	Fair	Fair

wildlife habitat and kinds of wildlife—Con.

wildlife habitat				Kinds of wildlife		
Hardwood trees	Coniferous trees	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Fair	Fair	Good	Fair	Fair	Fair	Fair.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Fair	Fair	Good	Good	Fair	Fair	Good.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
Fair	Fair	Poor	Very poor	Good	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Good	Good	Poor	Very poor	Fair	Good	Very poor.
Fair	Fair	Good	Good	Fair	Fair	Good.

TABLE 4.—*Suitability of soils for*

Map symbols	Mapping units	Elements of		
		Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants
StA	State fine sandy loam, 0 to 2 percent slopes	Good	Good	Good
StB	State fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
TaD	Tallapoosa loam, 6 to 15 percent slopes	Fair	Good	Good
TaE	Tallapoosa loam, 15 to 25 percent slopes	Poor	Fair	Good
TaF	Tallapoosa loam, 25 to 60 percent slopes	Very poor	Poor	Good
TlB	Tatum loam, 2 to 6 percent slopes	Fair	Good	Good
TlC2	Tatum loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
TlE2	Tatum loam, 15 to 25 percent slopes, eroded	Poor	Good	Good
TmD3	Tatum clay loam, 6 to 15 percent slopes, severely eroded	Fair	Good	Good
TmE3	Tatum clay loam, 15 to 25 percent slopes, severely eroded	Poor	Fair	Good
To	Toccoa fine sandy loam	Good	Good	Good
TuB	Turbeville fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
TuC2	Turbeville fine sandy loam, 6 to 15 percent slopes, eroded	Fair	Good	Good
VaB	Vance fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
VaB2	Vance fine sandy loam, 2 to 6 percent slopes, eroded	Good	Good	Good
VaC2	Vance fine sandy loam, 6 to 10 percent slopes, eroded	Fair	Good	Good
Wa	Wahee and Augusta loams	Poor	Fair	Fair
Wd	Wehadkee loam	Poor	Fair	Fair
WeA	White Store fine sandy loam, 0 to 2 percent slopes	Good	Good	Good
WeB	White Store fine sandy loam, 2 to 6 percent slopes	Good	Good	Good
WgA	White Store loam, 0 to 2 percent slopes	Good	Good	Good
WgB	White Store loam, 2 to 6 percent slopes	Good	Good	Good
WhA	White Store loam, wet variant, 0 to 2 percent slopes	Fair	Good	Good
WhB	White Store loam, wet variant, 2 to 6 percent slopes	Fair	Good	Good
WkB	Wilkes loam, 2 to 6 percent slopes	Poor	Fair	Fair
WkD	Wilkes loam, 6 to 15 percent slopes	Poor	Fair	Fair
WkE	Wilkes loam, 15 to 25 percent slopes	Poor	Fair	Fair
WkF	Wilkes loam, 25 to 60 percent slopes	Very poor	Poor	Fair
WlE3	Wilkes soils, 15 to 25 percent slopes, severely eroded	Poor	Fair	Fair
WoB	Worsham soils, 0 to 4 percent slopes	Poor	Fair	Fair

life habitat (*1*). The levels of suitability are expressed by the adjectives *good, fair, poor,* and *very poor. Good* means that habitat generally is easily created, improved, or maintained; that the soils have few or no limitations affecting management; and that satisfactory results can be expected. *Fair* means that habitat can be created, improved, or maintained, but the soils have moderate limitations and a moderate intensity of management and fairly frequent attention are commonly required for satisfactory results. *Poor* means that habitat can be created, improved, or maintained, but the soils have severe limitations and management is difficult and expensive and requires intensive effort. Results are not always satisfactory. *Very poor* means that under the prevailing soil conditions creating, improving, or maintaining habitat is impractical and unsatisfactory results are probable.

The seven elements of wildlife habitat listed in table 4 are described in the following paragraphs.

Grain and seed crops are domestic grains or other seed-producing annuals planted to produce wildlife food. Examples are corn, sorghum, wheat, oats, barley, millet, buckwheat, soybeans, cowpeas, and sunflowers.

Domestic grasses and legumes are domestic perennial grasses and herbaceous legumes planted for wildlife food or cover. Examples are fescue, orchardgrass, bluegrass, timothy, reed canarygrass, clover, alfalfa, lespedeza, trefoil, and crownvetch.

Wild herbaceous plants are native or naturally established dryland herbaceous grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are partridgepea, bluestem, wild millet, goldenrod, wild strawberry, broomsedge, beggarweed, pokeweed, ragweed, dandelion, wheatgrass, and grama.

Hardwood trees are nonconiferous trees and associated woody understory plants that provide wildlife cover or produce nuts, buds, catkins, twigs, bark, or foliage used as food by wildlife. These plants commonly have secondary value for nesting or escape cover. They are commonly established naturally, but can be planted or transplanted. Examples are oak, beech, hickory, maple, birch, locust, dogwood, viburnum, honeysuckle, grape, sumac, blackberry, autumnolive, multiflora rose, and shrub lespedeza.

Coniferous trees are cone-bearing trees or shrubs that furnish wildlife cover or supply food in the form of browse, seeds, or fruitlike cones. These are commonly established naturally, but can be planted. Examples are pine, spruce, hemlock, fir, cedar, juniper, larch, yew, and cypress.

Wetland plants are annual or perennial wild herbaceous plants on moist to wet sites, exclusive of submerged or floating aquatics, that produce food or cover used extensively by wetland wildlife. Examples are

wildlife habitat and kinds of wildlife—Con.

wildlife habitat				Kinds of wildlife		
Hardwood trees	Coniferous trees	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Fair	Fair	Very poor	Very poor	Good	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Fair	Fair	Fair	Good	Fair.
Fair	Fair	Good	Fair	Fair	Fair	Fair.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Poor	Poor	Good	Good	Poor.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Good	Good	Fair	Fair	Good	Good	Fair.
Good	Good	Poor	Very poor	Good	Good	Very poor.
Poor	Poor	Poor	Very poor	Fair	Poor	Very poor.
Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor.
Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor.
Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor.
Fair	Fair	Good	Good	Fair	Fair	Good.

smartweed, wildrice, rushes, sedges, reeds, cutgrass, arrowhead, and wild millet.

Shallow water areas are areas of surface water that average less than 5 feet deep and are useful to wildlife. Some are natural areas, and others were formed by dams or levees, in places in combination with some excavation, or by water-control devices in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, wildlife ponds, and beaver ponds.

The three kinds of wildlife habitat listed in table 4 are defined in the following paragraphs.

Openland wildlife refers to birds and mammals that normally live on cropland, pasture, meadow, lawns, and areas overgrown with grasses, herbs, shrubs, and vines. Examples are rabbit, quail, pheasant, mourning dove, field sparrow, meadowlark, killdeer, red fox, and woodchuck. Ratings in this column represent weighted averages of the ratings under the habitat elements grain and seed crops, domestic grasses and legumes, wild herbaceous plants, and hardwood trees or coniferous trees.

Woodland wildlife refers to birds and mammals of wooded areas made up of hardwoods or coniferous trees and shrubs, or a mixture of both. Examples are wild turkey, white-tailed deer, ruffed grouse, gray squirrel, gray fox, raccoon, wood thrush, vireos, warblers, and woodpeckers. Ratings in this column are obtained by weighing and averaging the ratings for the habitat elements domestic grasses and legumes, wild herbaceous plants, and hardwood trees or coniferous trees.

Wetland wildlife refers to birds and mammals of swamps, marshes, or areas of open water. Examples are ducks, coots, herons, geese, snipe, rails, kingfishers, mink, muskrat, and beaver. Ratings in this column are obtained by averaging the ratings for wetland plants with the ratings for shallow water areas.

Engineering [4]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, drainage, shrink-swell potential, grain size, plasticity, and reaction. Also important are depth to

[4] RICHARD A. GALLO, engineer, Soil Conservation Service, helped prepare this section.

the water table, depth to bedrock, and slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.

TABLE 5.—*Estimates of soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. carefully the instructions for referring to other series that appear in the first column

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	USDA texture
	Seasonal high water table	Bedrock		
	Feet	*Feet*	*Inches*	
Abell: AbB, AeB	2–3	>5	0–8	Fine sandy loam, loam
			8–42	Sandy clay loam, loam, clay loam
			42–60	Gravelly loam
*Appling:				
ApB, ApC2, AxE2	>5	>5	0–8	Fine sandy loam
For Wedowee part of AxE2, see Wedowee series.			8–42	Clay, clay loam
			42–60	Loam
AgB, AgC, AwE2	>5	>5	0–8	Gravelly sandy loam
For Wedowee part of AwE2, see Wedowee series.			8–42	Clay, clay loam
			42–60	Loam
Augusta	[1] 1–2	>5	0–8	Loam
Mapped only with Wahee soil.			8–34	Clay loam
			34–60	Gravelly loam, gravel
Bremo: BrD, BrE, BrF	>5	2–3½	0–12	Loam
			12–30	Flaggy loam
			30	Greenstone.
Brockroad	>5	>5	0–10	Loam
Mapped only with Georgeville soil.			10–60	Clay, silty clay
			60–102	Silty clay loam, silt loam
Buncombe: Bu	[1] 4–5	>5	0–42	Loamy fine sand
			42–47	Fine sandy loam
			47–72	Loamy fine sand
Cecil:				
CcB2, CcC2, CcE2, CeB3, CeD3, CeE3	>5	>5	0–5	Fine sandy loam
			5–44	Clay, clay loam
			44–86	Loam

6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 5 and 6, which show, respectively, estimates of soil properties significant in engineering and interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 5 and 6, and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigation at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit contain small areas of other kinds of soil

significant in engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow of this table. The symbol > means more than; the symbol < means less than]

Classification		Coarse fraction (fragments more than 3 inches in diameter)	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHTO		No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.047 mm)	No. 200 (0.074 mm)				
							Inches per hour	*Inches per inch of soil*	*pH*	
SM or ML	A-4		90–100	85–100	60–85	35–70	2.0–6.0	0.10–0.15	5.6–6.5	Low.
CL or SC	A-4 or A-6		90–100	85–100	70–95	35–75	0.6–2.0	0.13–0.19	4.5–6.0	Low.
GM, SM, or ML	A-4		65–85	55–75	45–70	35–55	2.0–6.0	0.08–0.12	4.5–5.5	Low.
SM or ML	A-4 or A-2		85–100	80–100	55–85	35–55	2.0–6.0	0.10–0.15	4.5–5.5	Low.
MH	A-7		90–100	85–100	75–95	60–95	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
ML or SM	A-4		90–100	85–100	60–90	45–70	0.6–2.0	0.12–0.15	4.5–5.5	Low.
SM	A-2 or A-1		75–85	55–70	30–50	15–30	2.0–6.0	0.05–0.10	4.5–5.5	Low.
MH	A-7		90–100	85–100	75–95	60–95	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
SM or ML	A-4		90–100	85–100	60–90	45–70	0.6–2.0	0.12–0.16	4.5–5.5	Low.
ML	A-4		90–100	85–100	70–95	50–75	0.6–2.0	0.12–0.17	6.1–6.5	Low.
MH or ML	A-6 or A-7		95–100	90–100	85–100	65–90	0.6–2.0	0.14–0.18	5.1–6.0	Low.
GM, GC, or GW-GM	A-1	10–20	15–40	10–36	10–30	5–25	2.0–6.0	0.02–0.09	5.6–6.0	Low.
ML or CL	A-4 or A-6		85–100	80–100	70–95	50–75	0.6–2.0	0.12–0.17	5.6–6.5	Low.
GM, SM, or ML	A-4	20–30	70–95	60–90	50–85	35–65	2.0–6.0	0.08–0.12	6.1–6.5	Low.
ML	A-4		85–100	80–100	70–95	55–75	0.6–2.0	0.14–0.17	5.6–6.5	Low.
MH or CL	A-7		90–100	85–100	75–100	65–95	0.6–2.0	0.12–0.18	4.5–6.0	Moderate.
CL, MH, or ML	A-7 or A-4		85–100	80–100	70–100	55–95	0.6–2.0	0.15–0.20	5.1–6.0	Moderate.
SM	A-2		95–100	95–100	70–95	15–35	>6.0	0.05–0.10	5.6–6.5	Low.
SM	A-4		95–100	95–100	65–85	40–50	>6.0	0.10–0.15	5.6–6.0	Low.
SM	A-2		95–100	95–100	70–95	15–35	>6.0	0.05–0.10	5.6–6.0	Low.
SM or ML	A-4 or A-2		80–100	75–100	50–85	30–55	2.0–6.0	0.10–0.15	5.6–6.9	Low.
MH or CL	A-7		90–100	85–100	75–100	60–95	0.6–2.0	0.10–0.16	4.5–5.5	Moderate.
ML	A-4		95–100	90–100	75–95	50–75	0.6–2.0	0.13–0.16	4.5–5.0	Low.

TABLE 5.—*Estimates of soil properties*

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	USDA texture
	Seasonal high water table	Bedrock		
	Feet	*Feet*	*Inches*	
CdC	>5	>5	0–5	Cobbly fine sandy loam
			5–44	Clay, clay loam
			44–86	Loam
*Chewacla: Ch, CT For Toccoa part of Ct, see Toccoa series.	[1] 1–1½	>5	0–15	Loam
			15–38	Silty clay loam
			38–68	Silt loam
Cullen: CuB, CuC2, CuE2, CxB3, CxC3, CxE3	>5	>5	0–5	Loam
			5–53	Clay loam, clay
			53–68	Loam, clay loam
Cut and fill land. No valid estimates can be made.				
Dogue: DoA, DoB	[1] 2–3	>5	0–8	Fine sandy loam
			8–57	Clay, clay loam
			57–64	Sandy clay loam
Elbert: Eb	[1] 0–1	[2] 4	0–6	Loam
			6–12	Clay loam
			12–33	Clay
			33–60	Sandy clay, sandy clay loam
Enon: EnB, EnC2	>5	3½–5	0–7	Fine sandy loam
			7–28	Clay
			28–60	Loam
Fluvanna: FlB2, FlC2, FlE2	>5	3½–5	0–6	Fine sandy loam
			6–45	Clay loam, clay
			45–60	Clay loam
Forestdale: Fo	[1] 0–1	>5	0–7	Silt loam
			7–62	Clay, silty clay loam
			62–70	Sandy clay loam
*Georgeville: GeB2, GeC2, GeE2, GrB For Brockroad part of GrB, see Brockroad series.	>5	>5	0–6	Loam
			6–35	Clay, clay loam
			35–70	Silty clay loam, silt loam
Gwinnett variant: GwB, GwC	>5	>5	0–5	Clay loam, loam
			5–53	Clay, clay loam
			53–60	Loam
Helena: HaB, HaC	1½–2½	>5	0–8	Fine sandy loam
			8–24	Clay loam, clay
			24–33	Clay
			33–60	Fine sandy loam

significant in engineering—Con.

Classification		Coarse fraction (fragments more than 3 inches in diameter)	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHTO		No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.047 mm)	No. 200 (0.074 mm)				
							Inches per hour	*Inches per inch of soil*	*pH*	
SM	A–2 or A–4	15–40	75–90	65–85	45–75	25–45	2.0–6.0	0.05–0.10	5.6–6.0	Low.
MH or CL	A–7		90–100	85–100	75–100	60–95	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
ML	A–4		95–100	90–100	75–95	50–75	0.6–2.0	0.13–0.16	4.5–5.0	Low.
ML or CL	A–4 or A–6		100	95–100	80–95	55–75	0.6–2.0	0.14–0.17	5.1–6.0	Low.
MH or CL	A–7 or A–6		100	95–100	90–100	80–95	0.6–2.0	0.16–0.19	5.1–5.5	Low.
ML	A–4		95–100	90–100	80–100	65–90	0.6–2.0	0.17–0.20	5.1–5.5	Low.
ML or CL	A–4 or A–6		95–100	90–100	80–100	55–75	0.6–2.0	0.14–0.17	5.6–6.0	Low.
MH	A–7		95–100	95–100	85–100	65–95	0.6–2.0	0.10–0.17	4.5–5.0	Moderate.
ML or CL	A–4, A–5, or A–6		90–100	85–100	70–100	50–80	0.6–2.0	0.14–0.19	4.5–5.0	Low.
ML or SM	A–4		90–100	85–100	60–85	35–55	2.0–6.0	0.10–0.15	6.8–7.2	Low.
MH, CL, or CH	A–7 or A–6		95–100	90–100	80–100	65–95	0.2–0.6	0.12–0.18	4.5–5.5	Moderate.
SC, SM, ML, or CL	A–2, A–6, or A–4		85–100	80–100	65–90	25–55	0.6–2.0	0.13–0.16	4.5–5.5	Low.
ML or CL	A–4 or A–6		95–100	90–100	75–95	55–75	0.6–2.0	0.14–0.17	5.6–7.8	Low.
CL or CH	A–6 or A–7		95–100	95–100	85–100	65–80	0.2–0.6	0.16–0.19	5.6–7.8	Moderate.
CH	A–7		95–100	95–100	85–100	80–95	<0.2	0.10–0.14	5.6–7.8	High.
CL or SC	A–2, A–7, or A–6	3–7	90–100	85–100	70–95	30–60	0.6–2.0	0.11–0.16	5.6–7.8	Moderate.
ML or SM	A–4		95–100	90–100	65–85	35–55	2.0–6.0	0.10–0.15	5.6–7.3	Low.
CH	A–7		95–100	90–100	80–100	70–95	0.06–0.2	0.10–0.15	5.6–7.3	Moderate.
SM	A–4 or A–2	10–20	40–75	35–70	30–60	20–50	0.6–2.0	0.05–0.12	5.6–7.3	Low.
ML or SM	A–4		95–100	90–100	65–85	35–55	2.0–6.0	0.10–0.15	4.5–5.5	Low.
CH or CL	A–7 or A–6		95–100	90–100	80–100	75–90	0.2–0.6	0.10–0.17	4.5–5.5	Moderate.
			90–95	85–95	75–95	60–75	0.2–0.6	0.14–0.17	4.5–5.5	Moderate.
ML or CL	A–7, A–6									
ML or CL	A–4 or A–6		95–100	90–100	80–100	65–90	0.6–2.0	0.14–0.17	4.5–6.5	Low.
CH	A–7		95–100	90–100	85–100	75–95	<0.06	0.10–0.17	4.5–6.5	High.
CL or SC	A–6 or A–2		80–100	75–100	60–90	25–55	0.2–0.6	0.13–0.16	4.5–6.5	Moderate.
ML	A–4		95–100	90–100	80–100	60–80	0.6–2.0	0.14–0.17	4.5–5.5	Low.
MH	A–7		95–100	90–100	80–100	65–95	0.6–2.0	0.12–0.19	4.5–5.5	Low.
ML or MH	A–7, A–6		85–100	80–100	70–100	55–95	0.6–2.0	0.16–0.20	4.5–5.5	Low.
CL or ML	A–7 or A–6		95–100	90–100	75–100	55–80	0.6–2.0	0.14–0.19	5.1–6.0	Moderate.
MH	A–7		95–100	95–100	85–100	65–95	0.6–2.0	0.12–0.17	5.1–6.0	Moderate.
ML or CL	A–4 or A–6		95–100	90–100	75–95	55–75	0.6–2.0	0.14–0.17	5.1–6.0	Low.
ML or SM	A–4		90–100	85–100	60–85	35–55	2.0–6.0	0.10–0.15	4.5–5.5	Low.
CL or CH	A–6, A–7		95–100	90–100	80–100	65–95	0.2–0.6	0.10–0.17	4.5–5.5	Moderate.
CH	A–7		95–100	95–100	85–100	70–95	0.06–0.2	0.10–0.14	4.5–5.5	High.
ML or SM	A–4		90–100	85–100	60–85	40–65	0.6–2.0	0.10–0.15	4.5–5.5	Low.

TABLE 5.—*Estimates of soil properties*

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	USDA texture
	Seasonal high water table	Bedrock		
	Feet	*Feet*	*Inches*	
Herndon: HdB, HdC	>5	>5	0–6	Loam
			6–48	Clay, clay loam
			48–72	Silt loam
Hiwassee: HwB2, HwC2, HwE2	>5	>5	0–7	Loam
			7–60	Clay
			60–70	Very gravelly clay loam
Iredell: IrB, IrB2, IrC, IrC2	1½–2½	3½–5	0–13	Loam, clay loam
			13–25	Clay
			25–42	Loam
			42	Weathered basic rock.
Louisburg: LoD, LoE, LoF	>5	2–4	0–7	Fine sandy loam
			7–17	Loam
			17–48	Fine sandy loam
			48	Granite gneiss.
Madison: MaB2, MaC2, MaE2	>5	[3] 3–5	0–8	Loam
			8–20	Clay
			20–48	Loam
			48	Mica schist.
***Manteo:** McD, McE, McF, MNE	>5	1–1½	0–10	Channery loam
Rock outcrop part of MNE is not included.			10–15	Very channery clay loam
			15	Sericite schist.
Masada: MpB, MpC, MsB2, MsC2, MtB	>5	>5	0–11	Fine sandy loam
			11–53	Clay, clay loam
			53–83	Sandy clay loam
MrB, MrC	>5	>5	0–11	Gravelly fine sandy loam
			11–53	Clay, clay loam
			53–83	Sandy clay loam
Mayodan: MwB, MwC, MyB2, MyC2	>5	>5	0–8	Fine sandy loam, loam
			8–52	Clay loam, clay
			52–60	Loam
Mecklenburg: MzB2, MzC2, MzE2	>5	[4]	0–7	Loam
			7–43	Clay
			43–60	Loam

significant in engineering—Con.

Classification		Coarse fraction (fragments more than 3 inches in diameter)	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHTO		No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.047 mm)	No. 200 (0.074 mm)				
							Inches per hour	*Inches per inch of soil*	*pH*	
ML	A–4		95–100	90–100	80–100	60–80	0.6–2.0	0.14–0.17	4.5–5.5	Low.
MH	A–7		95–100	90–100	80–100	65–100	0.6–2.0	0.12–0.19	4.5–5.5	Low.
ML or MH	A–7, A–6		85–100	80–100	70–100	55–90	0.6–2.0	0.17–0.20	4.5–5.5	Low.
ML or CL	A–4 or A–6		90–100	85–100	70–95	60–75	0.6–2.0	0.14–0.17	5.1–6.0	Low.
MH	A–6 or A–7		95–100	90–100	80–100	65–95	0.6–2.0	0.13–0.18	5.1–6.0	Moderate.
GC, SC, GM, GW–GC	A–7 or A–6		30–60	10–40	10–35	10–30	0.6–2.0	0.08–0.15	5.1–6.0	Moderate.
ML, CL–ML	A–4 or A–6		90–100	90–100	65–95	55–80	0.6–2.0	0.14–0.17	5.6–7.8	Low.
CH	A–7		95–100	95–100	85–100	75–95	0.06–0.2	0.15–0.20	5.6–7.8	High.
ML, CL–ML	A–4 or A–6		90–100	85–100	75–100	60–75	0.6–2.0	0.14–0.17	5.6–7.8	Moderate.
SM	A–4 or A–2		60–95	50–95	35–80	20–50	>6.0	0.05–0.14	4.5–6.0	Low.
SM or ML	A–4 or A–2	0–10	60–95	50–95	40–90	30–70	>6.0	0.07–0.16	4.5–6.0	Low.
SM	A–4 or A–2	0–15	60–95	50–95	35–80	20–50	>6.0	0.05–0.14	4.5–6.0	Low.
ML or SM	A–4 or A–6		80–100	75–100	65–95	45–75	0.6–2.0	0.12–0.17	4.5–5.5	Low.
MH	A–7		80–100	75–100	70–100	55–95	0.6–2.0	0.08–0.14	4.5–5.5	Moderate.
ML, SM	A–4 or A–6		80–100	75–100	65–95	45–75	0.6–2.0	0.12–0.17	4.5–5.5	Low.
GM or SM	A–4, A–2, or A–1	10–30	50–75	45–65	25–50	20–40	2.0–6.0	0.06–0.11	4.5–5.5	Low.
GC or GM	A–2 or A–1	15–35	50–80	30–50	25–50	15–30	2.0–6.0	0.07–0.12	4.5–5.5	Low.
ML or SM	A–4 or A–2		90–100	80–100	60–85	30–55	2.0–6.0	0.10–0.15	4.5–5.0	Low.
MH, CH	A–7 or A–6		90–100	85–100	75–100	60–95	0.6–2.0	0.10–0.17	4.5–5.5	Moderate.
SC, CH	A–4 or A–6		90–100	85–100	70–95	40–80	0.6–2.0	0.13–0.16	4.5–5.5	Low.
SM	A–4, A–2		65–85	55–75	40–65	15–40	2.0–6.0	0.07–0.11	4.5–5.5	Low.
MH, CH	A–7 or A–6		85–100	80–100	70–100	55–95	0.6–2.0	0.10–0.17	4.5–5.5	Moderate.
SC or CH	A–4 or A–6		90–100	85–100	70–95	40–80	0.6–2.0	0.13–0.16	4.5–5.5	Low.
ML or SM	A–4 or A–2		70–95	65–95	40–90	25–70	2.0–6.0	0.10–0.15	4.5–5.5	Low.
MH, CH	A–7		90–100	85–100	80–100	60–95	0.6–2.0	0.10–0.16	4.5–5.5	Low.
ML or SM	A–4		90–100	85–100	70–95	45–75	0.6–2.0	0.13–0.17	4.5–5.5	Low.
ML or CL	A–4 or A–6		95–100	90–100	75–95	55–75	0.6–2.0	0.14–0.17	5.6–6.5	Low.
MH or CH	A–7		95–100	90–100	80–100	65–95	0.06–0.2	0.10–0.14	5.6–7.3	Moderate.
ML, CL	A–4 or A–6		90–100	85–100	70–95	55–75	0.2–0.6	0.14–0.17	5.6–7.3	Low.

TABLE 5.—*Estimates of soil properties*

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	USDA texture
	Seasonal high water table	Bedrock		
	Feet	*Feet*	*Inches*	
Nason: NaB, NaC, NaE	>5	3½–5	0–7	Loam
			7–35	Clay loam, silty clay, silty clay loam
			35–50	Loam
			50	Sericite schist.
Penn: PeA, PeB, PeC	>5	2–3½	0–12	Silt loam
			12–18	Shaly silty clay loam
			18–37	Very shaly silt loam
			37	Triassic shale.
***Pinkston:** PkB, PkD, PpE	>5	2–3½	0–17	Fine sandy loam
For Penn part of PpE, see Penn series.			17–40	Fine sandy loam
			40	Triassic sandstone.
Riverview: Re	[1]3	>5	0–27	Loam
			27–38	Silt loam
			38–64	Silty clay loam
Roanoke: Ro	[1]0–1	[1]3½	0–3	Silt loam
			3–60	Clay
			60	Triassic shale.
State: StA, StB	[1]3	>5	0–11	Fine sandy loam
			11–52	Sandy clay loam, clay loam
			52–60	Fine sandy loam
Tallapoosa: TaD, TaE, TaF	>5	2–5	0–10	Loam
			10–17	Clay loam
			17–30	Loam
			30	Mica schist.
Tatum: TlB, TlC2, TlE2, TmD3, TmE3	>5	3½–5	0–8	Loam, clay loam
			8–29	Clay, clay loam
			29–50	Silt loam
			50	Quartz sericite schist.
Toccoa: To	[1]3	>5	0–64	Fine sandy loam
Turbeville: TuB, TuC2	>5	>5	0–10	Fine sandy loam
			10–72	Clay
Vance: VaB, VaB2, VaC2	>5	[1]4	0–7	Fine sandy loam
			7–43	Clay, clay loam
			43–60	Loam
***Wahee:** Wa	[1]1–1½	>5	0–9	Loam
For Augusta part, see Augusta series.			9–27	Clay
			27–46	Sandy clay loam
			46–50	Gravelly sand

significant in engineering—Con.

Classification		Coarse fraction (fragments more than 3 inches in diameter)	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHTO		No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.047 mm)	No. 200 (0.074 mm)				
							Inches per hour	*Inches per inch of soil*	*pH*	
ML or SM	A–4		80–100	75–100	65–95	45–75	0.6–2.0	0.10–0.17	4.5–5.5	Low.
MH or CH	A–7		80–100	75–100	70–100	55–95	0.6–2.0	0.08–0.19	4.5–5.5	Moderate.
ML or SM	A–4		80–100	75–100	65–95	45–75	0.6–2.0	0.10–0.17	4.5–5.5	Low.
ML, SM	A–4		80–100	75–100	65–100	50–90	2.0–6.0	0.17–0.20	5.1–6.0	Low.
CL, ML, or SM	A–6		55–75	50–70	50–70	45–65	0.6–6.0	0.10–0.14	5.1–6.0	Low.
GM	A–4, A–2	5–20	35–60	25–50	25–50	20–45	0.6–6.0	0.04–0.08	5.1–6.0	Low.
SM	A–4 or A–2		70–90	50–80	35–65	20–45	2.0–6.0	0.05–0.12	4.5–5.5	Low.
SM or SW–SM	A–2	5–20	40–60	25–45	20–45	10–30	2.0–6.0	0.04–0.08	4.5–5.5	Low.
ML	A–4		100	95–100	80–95	55–75	0.6–2.0	0.14–0.17	4.5–5.5	Low.
ML or CL	A–4 or A–6		100	95–100	85–100	65–90	0.6–2.0	0.17–0.20	4.5–5.5	Low.
CL	A–6 or A–7		100	95–100	90–100	80–95	0.6–2.0	0.16–0.19	4.5–5.5	Low.
ML or CL	A–4 or A–6		100	95–100	85–100	65–90	0.6–2.0	0.17–0.20	<4.5–5.5	Low.
MH or CH	A–7		90–100	85–100	75–100	65–95	0.06–0.2	0.10–0.14	<4.5–5.5	Moderate.
ML or SM	A–4		90–100	85–100	60–85	35–55	2.0–6.0	0.10–0.15	4.5–6.5	Low.
CL or SC	A–4 or A–6		90–100	85–100	70–100	30–80	2.0–6.0	0.13–0.18	4.5–6.5	Low.
ML or SM	A–4		90–100	85–100	60–85	35–55	2.0–6.0	0.10–0.15	4.5–6.5	Low.
ML, CL, or SM	A–4 or A–6		80–95	75–95	65–90	45–70	0.6–2.0	0.14–0.17	4.5–5.5	Low.
CL	A–6		80–95	75–95	70–95	50–75	0.6–2.0	0.14–0.17	4.5–5.5	Low.
ML or SM	A–4 or A–6		85–95	75–95	65–90	45–70	2.0–6.0	0.10–0.15	4.5–5.5	Low.
ML, CL, MH	A–4, A–7		80–100	60–100	60–95	55–90	0.6–2.0	0.16–0.19	4.5–5.5	Low.
MH, MH–CH	A–7		80–100	75–100	65–100	65–95	0.6–2.0	0.12–0.19	4.5–5.5	Moderate.
ML, MH	A–5 or A–7		80–100	75–100	65–100	50–85	0.6–2.0	0.08–0.12	4.5–5.5	Low.
ML or SM	A–4		95–100	75–100	60–85	35–55	2.0–6.0	0.10–0.15	5.6–6.5	Low.
ML or SM	A–4, A–2		80–95	75–95	50–80	30–50	2.0–6.0	0.10–0.15	4.5–5.5	Low.
MH, CH, or CL	A–7		80–95	75–95	70–95	55–90	0.6–2.0	0.10–0.14	4.5–5.5	Moderate.
ML or SM	A–4		85–100	80–100	55–85	35–60	2.0–6.0	0.10–0.15	4.5–5.5	Low.
MH, CH	A–7		95–100	90–100	80–100	65–95	0.06–0.2	0.10–0.17	4.5–5.5	Moderate.
ML or SM	A–4		90–100	85–100	70–95	45–75	0.6–2.0	0.12–0.16	4.5–5.5	Low.
ML or CL	A–4 or A–6		90–100	85–100	70–95	50–75	0.6–2.0	0.14–0.17	4.5–5.5	Low.
MH, CH, or CL	A–7		95–100	90–100	80–100	65–95	0.06–0.2	0.10–0.14	4.5–5.5	Moderate.
CL or SC	A–4 or A–2		80–100	75–100	50–85	30–55	2.0–6.0	0.10–0.15	4.5–5.5	Low.
GW or GP	A–1		25–50	10–35	5–25	0–5	>6.0	0.02–0.05	4.5–5.5	Low.

TABLE 5.—*Estimates of soil properties*

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	USDA texture
	Seasonal high water table	Bedrock		
	Feet	*Feet*	*Inches*	
Wedowee Mapped only with Appling soil.	>5	[2] 4	0–6	Fine sandy loam or gravelly sandy loam
			6–27	Clay, clay loam
			27–60	Loam
Wehadkee: Wd	[1] 0–1	>5	0–23	Loam
			23–37	Clay loam
			37–50	Very gravelly loam
White Store: WeA, WeB, WgA, WgB	1½–2½	3½–5	0–8	Loam, fine sandy loam
			8–31	Clay
			31–50	Clay layers separated by sandstone and shale.
			50	Triassic shale.
White Store variant: WhA, WhB	1–1½	3½–5	0–8	Loam
			8–14	Clay loam
			14–33	Clay
			33–43	Weathered Triassic shale.
			43	Triassic shale.
Wilkes: WkB, WkD, WkE, WkF, WlE3	>5	2–4	0–4	Loam
			4–11	Clay
			11–29	Loam
			29	Mica schist and greenstone.
Worsham: WoB	[1] 0–1	>5	0–5	Fine sandy loam
			5–60	Clay, clay loam

[1] Subject to flooding.
[2] Or more.

TABLE 6.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series that appear in the first column of this

Soil series and map symbols	Suitability for winter grading	Suitability as source of—		
		Road fill	Sand and gravel	Topsoil
Abell: AbB, AeB	Fair trafficability; seasonal high water table; high soil moisture.	Fair: too silty	Unsuited	Fair: shallow over sandy clay loam.
*Appling: ApB, ApC2, AxE2 For Wedowee part of AxE2, see Wedowee series.	Fair trafficability; slopes up to 25 percent; clayey subsoil; moderate soil moisture.	Fair: clayey subsoil; moderate shrink-swell potential; slopes up to 25 percent.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.

significant in engineering—Con.

Classification		Coarse fraction (fragments more than 3 inches in diameter)	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHTO		No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.047 mm)	No. 200 (0.074 mm)				
							Inches per hour	*Inches per inch of soil*	*pH*	
SM	A–4 or A–2		70–95	65–95	40–80	20–50	2.0–6.0	0.08–0.15	4.5–5.5	Low.
MH	A–7		95–100	90–100	80–100	65–95	0.6–2.0	0.10–0.15	4.5–5.5	Moderate.
ML or SM	A–6 or A–4		95–100	90–100	75–95	45–75	0.6–2.0	0.12–0.17	4.5–5.5	Low.
ML or CL	A–4 or A–6		45–100	95–100	80–95	55–75	0.6–2.0	0.14–0.17	5.6–6.5	Low.
CL	A–6 or A–7		85–100	80–100	70–100	50–80	0.6–2.0	0.16–0.19	5.6–6.5	Low.
GM, GC, SM, ML	A–1, A–4, or A–6		35–90	25–85	20–80	15–65	0.6–6.0	0.02–0.06	5.6–6.5	Low.
ML or SM	A–4		95–100	90–100	65–95	35–55	0.6–2.0	0.14–0.17	4.5–5.0	Low.
CH, CL	A–7		95–100	90–100	80–100	65–95	<0.6	0.10–0.14	4.5–5.0	High.
							0.06–0.2	0.03–0.05	4.5–5.0	Low.
ML or CL	A–4 or A–6		95–100	90–100	75–95	55–75	0.6–2.0	0.14–0.17	4.5–5.5	Low.
CL or CH	A–6 or A–7		80–100	75–100	65–100	50–80	0.6–2.0	0.16–0.19	4.5–5.5	Moderate.
CH	A–7		95–100	90–100	80–100	65–95	<0.06	0.10–0.14	4.5–5.5	High.
ML or SM	A–4		90–100	85–100	70–95	45–75	0.6–2.0	0.14–0.17	5.6–7.3	Low.
CL, CH, or MH	A–7, A–6		95–100	90–100	80–100	65–90	0.2–0.6	0.10–0.14	5.6–7.3	Moderate.
ML or SM	A–4		90–100	85–100	70–95	45–75	0.6–2.0	0.13–0.16	5.6–7.3	Low.
ML or SM	A–4		95–100	90–100	65–85	35–55	2.0–6.0	0.10–0.15	4.5–5.5	Low.
MH or CH	A–7		95–100	90–100	80–100	65–95	0.06–0.6	0.10–0.16	4.5–5.5	Moderate.

interpretations

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the table. Too variable to estimate are: Cut and fill land, and Urban land complexes]

Impoundments		Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Pond reservoir areas	Embankments and dikes				
Seasonal high water table; moderate permeability; seepage.	Medium compressibility; medium piping hazard; fair to good compaction.	Moderately well drained; moderate permeability; flooding.	Medium available water capacity; seasonal high water table; flooding; moderate intake rate.	Siltation of channels; short slopes; erodible.	Moderately well drained; siltation of channels; seepage.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up to 25 percent; erodible.	Slopes up to 25 percent; cut channels clayey; erodible.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability for winter grading	Suitability as source of—		
		Road fill	Sand and gravel	Topsoil
AgB, AgC, AwE2 ... For Wedowee part of AwE2, see Wedowee series.	Fair trafficability; slopes up to 25 percent; clayey subsoil; moderate soil moisture.	Fair: clayey subsoil; moderate shrink-swell potential; slopes up to 25 percent.	Unsuited	Poor: coarse fragments; slopes up to 25 percent; too clayey; hard to reclaim borrow areas.
Augusta ... Mapped only with Wahee soil.	Poor trafficability; seasonal high water table; flooding; high soil moisture.	Fair: too silty; somewhat poorly drained.	Poor: too silty	Fair: too clayey
Bremo: BrD, BrE, BrF	Fair trafficability; slopes up to 60 percent; low plasticity; moderate soil moisture.	Poor: bedrock at a depth of 2 to 3½ feet; slopes up to 60 percent; stones.	Unsuited	Poor: hard to reclaim borrow areas.
Brockroad ... Mapped only with Georgeville soils.	Fair trafficability; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil	Unsuited	Poor: too clayey; hard to reclaim borrow areas.
Buncombe: Bu	Good trafficability; low plasticity; low soil moisture; flooding.	Fair: too silty	Poor: too silty	Poor: too sandy
Cecil: CcB2, CcC2, CcE2, CeB3, CeD3, CeE3.	Fair trafficability; clayey subsoil; slopes up to 25 percent; moderate soil moisture.	Fair: clayey subsoil; moderate shrink-swell potential.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.
CdC	Fair trafficability; clayey subsoil; moderate soil moisture; cobblestones in surface layer.	Fair: clayey subsoil; moderate shrink-swell potential; cobblestones in surface layer.	Unsuited	Poor: too clayey; cobblestones and pebbles in surface layer; hard to reclaim borrow areas.
*Chewacla: Ch, CT ... For Toccoa part of CT, see Toccoa series.	Poor trafficability; seasonal high water table; high soil moisture; flooding.	Fair: too silty; seasonal high water table.	Unsuited	Good: flooding
Cullen: CuB, CuC2, CuE2, CxB3, CxC3, CxE3.	Fair trafficability; clayey subsoil; moderate soil moisture; slopes up to 25 percent.	Poor: clayey subsoil; moderate shrink-swell potential.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.
Cut and fill land. No data. Material too variable.				

interpretations—Con.

Impoundments		Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Pond reservoir areas	Embankments and dikes				
Moderate permeability; seepage.	Medium to high compressibility; high piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up to 25 percent.	Slopes up to 25 percent; cut channels clayey; erodible.
Seasonal high water table; moderate permeability; seepage.	Medium compressibility and piping hazard; fair compaction.	Somewhat poorly drained; moderate permeability; flooding.	Somewhat poorly drained; medium available water capacity; flooding.	Not applicable	Not applicable.
Moderately rapid permeability; seepage; bedrock at a depth of 2 to 3½ feet.	Medium to high piping hazard; fair compaction; stones.	Somewhat excessively drained.	Low available water capacity; rapid intake rate; slopes up to 60 percent; bedrock at a depth of 2 to 3½ feet; erodible.	Moderately rapid permeability; bedrock at a depth of 2 to 3½ feet; slopes up to 60 percent.	Not applicable.
Moderate permeability.	Medium to high compressibility; medium piping hazard; fair compaction.	Well drained	Some water erosion hazard on slopes; medium available water capacity; moderate intake rate; erodible.	Features generally favorable.	Features generally favorable.
Rapid permeability	Fair to good compaction; medium to low permeability; medium to high piping hazard.	Excessively drained; flooding.	Low available water capacity; rapid intake rate; flooding.	Not applicable	Not applicable.
Moderate permeablity.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up to 25 percent.	Slopes up to 25 percent; cut channels clayey; erodible.
Moderate permeability; seepage.	Medium to high compressibility; medium to high piping hazard; fair compaction; cobblestones and pebbles in surface layer.	Well drained	Medium available water capacity; moderate intake rate; cobblestones and pebbles in surface layer.	Cobblestones and pebbles in surface layer; difficult to establish plant stands; cut channels clayey.	Cobblestones and pebbles in surface layer; slopes up to 15 percent; difficult to establish plant stands.
Moderate permeability; seepage; flooding.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Somewhat poorly drained; moderate permeability; flooding.	High available water capacity; moderate intake rate; flooding; somewhat poorly drained.	Not applicable	Not applicable.
Moderate permeability.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up to 25 percent.	Slopes up to 25 percent; cut channels clayey; erodible.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability for winter grading	Suitability as source of—		
		Road fill	Sand and gravel	Topsoil
Dogue: DoA, DoB	Poor trafficability; clayey subsoil; seasonal high water table; high soil moisture; flooding.	Fair: clayey subsoil; moderate shrink-swell potential.	Poor: too silty	Fair: too clayey; hard to reclaim borrow areas.
Elbert: Eb	Poor trafficability; seasonal high water table; plastic, clayey subsoil; high soil moisture; flooding.	Poor: plastic, clayey subsoil; high shrink-swell potential; poorly drained.	Unsuited	Poor: thin surface layer; poorly drained.
Enon: EnB, EnC2	Poor trafficability; clayey subsoil; high soil moisture.	Poor: clayey subsoil; moderate shrink-swell potential.	Unsuited	Poor: too clayey; hard to reclaim borrow areas.
Fluvanna: FlB2, FlC2, FlE2.	Fair trafficability; slopes up to 25 percent; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil; slopes up to 25 percent.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes are up to 25 percent.
Forestdale: Fo	Poor trafficability; seasonal high water table; plastic, clayey subsoil; high soil moisture; flooding.	Poor: plastic, clayey subsoil; high shrink-swell potential; poorly drained.	Unsuited	Poor: thin surface layer; poorly drained
***Georgeville:** GeB2, GeC2, GeE2, GrB. For Brockroad part of GrB, see **Brockroad series.**	Fair trafficability; slopes up to 25 percent; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil; slopes up to 25 percent.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to to 25 percent.
Gwinnett variant: GwB, GwC.	Poor trafficability; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil; moderate shrink-swell potential.	Unsuited	Poor: too clayey; hard to reclaim borrow areas.
Helena: HaB, HaC	Poor trafficability; seasonal high water table; plastic, clayey subsoil; high soil moisture.	Poor: plastic, clayey subsoil; high shrink-swell potential.	Unsuited	Poor: too clayey; hard to reclaim borrow areas.
Herndon: HdB, HdC	Fair trafficability; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil	Unsuited	Fair: too clayey
Hiwassee: HwB2, HwC2, HwE2.	Fair trafficability; clayey subsoil; moderate soil moisture.	Fair: clayey subsoil	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.

interpretations—Con.

Impoundments		Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Pond reservoir areas	Embankments and dikes				
Moderately slow permeability; seasonal high water table; seepage.	Medium to high compressibility; medium piping hazard; fair compaction.	Moderately well drained; moderately slow permeability; seasonal high water table; flooding.	Medium available water capacity; slow intake rate; flooding.	Moderately slow permeability; siltation of channels.	Moderately well drained; siltation of channels; seepage.
Seasonal high water table; slow to very slow permeability; seepage.	Medium to high compressibility; fair to poor compaction.	Poorly drained; slow to very slow permeability; flooding.	Not applicable	Not applicable	Not applicable.
Slow permeability; seepage.	Medium to high compressibility; low piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; slow intake rate; erodible.	Slow permeability: slopes commonly short and complex; cut channels clayey.	Cut channels clayey; erodible.
Moderately slow permeability; seepage.	Medium to high compressibility; low piping hazard; fair compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent; erodible.	Slopes commonly short and complex; slopes up to 25 percent.	Slopes up to 25 percent; cut channels clayey; erodible.
Some seepage hazard in substratum; subject to flooding; seasonal high water table; very slow permeability; seepage.	Medium to high compressibility; fair to poor compaction; medium to low piping hazard.	Very slow permeability; seasonal high water table; some areas subject to infrequent flooding; difficult to locate outlets; poorly drained.	Not applicable	Not applicable	Not applicable.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up to 25 percent.	Slopes up to 25 percent; cut channels clayey; erodible.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; slow intake rate; erodible.	Slopes commonly short and complex; cut channels clayey; erodible.	Cut channels clayey; erodible.
Seasonal high water table; slow permeability; seepage.	Medium to high compressibility; low piping hazard; fair to poor compaction.	Moderately well drained; slow permeability.	Medium available water capacity; slow intake rate; erodible.	Slow permeability; slopes commonly short and complex; cut channels clayey; erodible.	Moderately well drained; cut channels are clayey; siltation of channels; medium available water capacity; erodible.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate; erodible.	Slopes commonly short and complex; cut channels clayey; erodible.	Cut channels clayey; erodible.
Moderate permeability.	High compressibility; poor compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent.	Slopes commonly short; cut channels clayey; erodible.	Slopes up to 25 percent; cut channels clayey; erodible.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability for winter grading	Suitability as source of—		
		Road fill	Sand and gravel	Topsoil
Iredell: IrB, IrB2, IrC, IrC2.	Poor trafficability; seasonal high water table; plastic, clayey subsoil; high soil moisture.	Poor: plastic, clayey subsoil; high shrink-swell potential.	Unsuited	Poor: too clayey; hard to reclaim borrow areas.
Louisburg: LoD, LoE, LoF.	Good trafficability; low plasticity; low soil moisture; slopes up to 60 percent.	Fair: bedrock at a depth of 2 to 4 feet.	Poor: too silty	Poor: hard to reclaim borrow areas; slopes up to 60 percent.
Madison: MaB2, MaC2, MaE2.	Fair trafficability; slopes up to 25 percent; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil; moderate shrink-swell potential; slopes up to 25 percent.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.
*Manteo: McD, McE, McF, MNE. Rock outcrop part of MNE is not included.	Fair trafficability; low plasticity; moderate soil moisture; slopes up to 60 percent.	Poor: bedrock at a depth of 1 foot to 1½ feet.	Unsuited	Poor: bedrock at a depth of 1 foot to 1½ feet; hard to reclaim borrow areas; slopes up to 60 percent.
Masada: MpB, MpC, MrB, MrC, MsB2, MsC2, MtB.	Slopes up to 15 percent; fair workability; fair trafficability; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil; moderate shrink-swell potential.	Unsuited: local areas have small beds of gravel.	Fair: too clayey; local areas have pebbles in surface layer.
Mayodan: MwB, MwC, MyB2, MyC2.	Slopes up to 15 percent; fair workability; fair trafficability; clayey subsoil; moderate soil moisture.	Fair: clayey subsoil	Unsuited	Poor: too clayey; hard to reclaim borrow areas.
Mecklenburg: MzB2, MzC2, MzE2.	Slopes up to 25 percent; fair workability; fair trafficability; clayey subsoil; moderate soil moisture; slopes up to 25 percent.	Poor: clayey subsoil; moderate shrink-swell potential; slopes up to 25 percent.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.
Nason: NaB, NaC, NaE	Fair trafficability; slopes up to 25 percent; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil; moderate shrink-swell potential; slopes up to 25 percent.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.

interpretations—Con.

Impoundments		Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Pond reservoir areas	Embankments and dikes				
Seasonal high water table; slow permeability.	Medium to high compressibility; fair to poor compaction.	Moderately well drained to somewhat poorly drained; slow permeability.	Medium available water capacity; slow intake rate; erodible.	Slow permeability; short slopes; plastic, clayey subsoil; erodible.	Moderately well drained to somewhat poorly drained; cut channels clayey; erodible.
Rapid permeability; seepage; bedrock at a depth of 2 to 4 feet.	High piping hazard; fair compaction.	Somewhat excessively drained to excessively drained.	Low available water capacity; rapid intake rate; bedrock at a depth of 2 to 4 feet; slopes up to 60 percent.	Rapid permeability; bedrock at a depth of 2 to 4 feet; slopes up to 60 percent.	Not applicable.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair compaction; highly micaceous in lower subsoil and substratum.	Well drained	Slopes up to 25 percent; erodible; medium available water capacity; moderate intake rate; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up to 25 percent; erodible.	Slopes up to 25 percent; cut channels clayey; erodible.
Moderately rapid permeability; seepage; bedrock at a depth of 1 foot to 1½ feet.	Medium piping hazard; fair compaction; bedrock at a depth of 1 foot to 1½ feet.	Somewhat excessively drained.	Low available water capacity; rapid intake rate; bedrock at a depth of 1 foot to 1½ feet; slopes up to 60 percent; erodible.	Shallow to hard rock; difficult to establish plant stands and growth; short and complex slopes; moderately rapid permeability; bedrock at a depth of 1 foot to 1½ feet; slopes up to 60 percent.	Not applicable.
Moderate permeability; seepage.	Medium to high compressibility; fair compaction.	Well drained	Medium available water capacity; moderate intake rate; erodible.	Features generally favorable.	Features generally favorable.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair compaction.	Well drained	Medium available water capacity; moderate intake rate.	Slopes commonly short; cut channels clayey.	Cut channels clayey; erodible.
Some seepage hazard in substratum; slow permeability.	Medium to high compressibility; medium to low piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; slow intake rate; slopes up to 25 percent; erodible.	Slow permeability; slopes commonly short and complex; cut channels clayey; slopes up 25 percent.	Slopes up to 25 percent; cut channels clayey; erodible.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Slopes up to 25 percent; medium available water capacity; moderate intake rate; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up 25 percent; erodible.	Slopes up to 25 percent; cut channels clayey; erodible.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability for winter grading	Suitability as source of—		
		Road fill	Sand and gravel	Topsoil
Penn: PeA, PeB, PeC	Fair trafficability; moderate soil moisture; slopes up to 25 percent.	Fair: too silty; bedrock at a depth of 2 to 3½ feet.	Unsuited	Poor: hard to reclaim borrow areas; slopes up to 25 percent.
***Pinkston:** PkB, PkD, PpE. For Penn part of PpE, see Penn series.	Slopes up to 25 percent; good trafficability; low plasticity; low soil moisture.	Fair: bedrock at a depth of 2 to 3½ feet.	Poor: too silty	Poor: hard to reclaim borrow areas; slopes up to 25 percent.
Riverview: Re	Poor trafficability; high soil moisture; flooding.	Fair: too silty	Unsuited	Good
Roanoke: Ro	Poor trafficability; seasonal high water table; plastic, clayey subsoil; high soil moisture; flooding.	Poor: plastic, clayey subsoil; moderate shrink-swell potential; poorly drained.	Unsuited	Poor: thin surface layer; too clayey; poorly drained.
State: StA, StB	Fair trafficability; high soil moisture; flooding.	Poor: too silty	Unsuited	Good
Tallapoosa: TaD, TaE, TaF	Fair trafficability; moderate soil moisture; slopes up to 60 percent.	Fair: too silty; bedrock at a depth of 2 to 5 feet; slopes up to 60 percent.	Unsuited	Poor: hard to reclaim borrow areas; slopes up to 60 percent.
Tatum: TlB, TlC2, TlE2, TmD3, TmE3.	Fair trafficability; slopes up to 25 percent; clayey subsoil; moderate soil moisture.	Poor: clayey subsoil; moderate shrink-swell potential; slopes up to 25 percent.	Unsuited	Poor: too clayey; hard to reclaim borrow areas; slopes up to 25 percent.
Toccoa: To	Fair trafficability; high soil moisture; flooding.	Fair: too silty	Poor: too silty	Good
Turbeville: TuB, TuC2	Poor trafficability; clayey subsoil; high soil moisture.	Poor: clayey subsoil	Unsuited	Poor: hard to reclaim borrow areas.
Vance: VaB, VaB2, VaC2.	Poor trafficability; plastic, clayey subsoil; high soil moisture.	Poor: plastic, clayey subsoil; high shrink-swell potential.	Unsuited	Poor: too clayey; hard to reclaim borrow areas.

interpretations—Con.

Impoundments		Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Pond reservoir areas	Embankments and dikes				
Moderate to moderately rapid permeability; seepage; bedrock at a depth of 2 to 3½ feet.	Medium compressibility; medium to high piping hazard; fair compaction.	Well drained	Low available water capacity; moderate intake rate; bedrock at a depth of 2 to 3½ feet; slopes up to 25 percent; erodible.	Slopes commonly short; siltation of channels; bedrock at a depth of 2 to 3½ feet; slopes up to 25 percent; erodible.	Low available water capacity; slopes up to 25 percent; siltation of channels; erodible.
Moderately rapid permeability; seepage; bedrock at a depth of 2 to 3½ feet.	Medium compressibility; medium to high piping hazard; fair compaction.	Well drained to somewhat excessively drained.	Low available water capacity; rapid intake rate; bedrock at a depth of 2 to 3½ feet; slopes up to 25 percent; erodible.	Slopes commonly short; moderately rapid permeability; siltation of channels; bedrock at a depth of 2 to 3½ feet; slopes up to 25 percent.	Slopes up to 25 percent; low available water capacity; siltation of channels; erodible.
Moderate permeability; seepage; flooding.	Medium compressibility; medium to high piping hazard; fair to poor compaction.	Well drained; flooding.	High available watter capacity; moderate intake rate; flooding.	Not applicable	Not applicable.
Seasonal high water table; slow permeability; seepage.	High compressibility; poor compaction; medium piping hazard.	Poorly drained; slow permeability; flooding.	Medium available water capacity; slow intake rate; slow permeability; flooding.	Not applicable	Not applicable.
Moderately rapid permeability; seepage.	Medium piping hazard; good compaction; medium compressibility.	Well drained	Medium available water capacity; moderate intake rate; flooding.	Features generally favorable.	Features generally favorable.
Moderate permeability; seepage; bedrock at a depth of 2 to 5 feet.	Medium to high piping hazard; fair compaction; highly micaceous.	Well drained	Low available water capacity; rapid intake rate; bedrock at a depth of 2 to 5 feet; slopes up 60 percent; erodible.	Slopes not uniform; slopes commonly short; siltation of channels; bedrock at a depth of 2 to 5 feet; slopes up to 60 percent.	Slopes up to 60 percent; low available water capacity; siltation of channels; erodible.
Moderate permeability; seepage.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Slopes up to 25 percent; medium available water capacity; moderate intake rate; erodible.	Slopes commonly short and complex; cut channels clayey; slopes up to 25 percent; erodible.	Slopes up to 25 percent; cut channels clayey; erodible.
Moderately rapid permeability; seepage.	Medium to high piping hazard; fair compaction; medium compressibility.	Well drained; flooding.	Medium available water capacity; moderate intake rate; flooding.	Not applicable	Not applicable.
Moderate permeability.	Medium to high compressibility; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate.	Features generally favorable.	Features generally favorable.
Slow permeability	Medium to high compressibility; low piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; slow intake rate; erodible.	Slopes commonly short and complex; cut channels clayey; erodible.	Cut channels clayey; erodible.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability for winter grading	Suitability as source of—		
		Road fill	Sand and gravel	Topsoil
*Wahee: Wa. For Augusta part, see Augusta series.	Poor trafficability; seasonal high water table; high soil moisture; flooding.	Fair: too clayey; somewhat poorly drained.	Poor: too silty; local areas have sand and gravel below a depth of 4 feet.	Poor: too clayey
Wedowee. Mapped only with Appling soils.	Fair trafficability; moderate soil moisture; slopes up to 25 percent.	Fair: too clayey; moderate shrink-swell potential; slopes up to 25 percent.	Unsuited	Fair: too clayey; slopes up to 25 percent; pebbles in surface layer.
Wehadkee: Wd	Poor trafficability; seasonal high water table; high soil moisture; flooding.	Poor: too silty; poorly drained.	Poor: too silty	Poor: poorly drained
White Store: WeA, WeB, WgA, WgB.	Poor trafficability; seasonal high water table; clayey subsoil; high soil moisture.	Poor: clayey subsoil; high shrink-swell potential.	Unsuited	Poor: thin surface layer; clayey subsoil; hard to reclaim borrow areas.
White Store variant: WhA, WhB	Poor trafficability; seasonal high water table; high soil moisture.	Poor: plastic, clayey subsoil; somewhat poorly drained.	Unsuited	Poor: plastic, clayey subsoil; hard to reclaim borrow areas.
WkB, WkD, WkE, WkF, WlE3.	Fair trafficability; moderate soil moisture; slopes up to 60 percent.	Poor: too clayey; bedrock at a depth of 2 to 4 feet; slopes up to 60 percent.	Unsuited	Poor: hard to reclaim borrow areas; slopes up to 60 percent.
Worsham: WoB	Poor trafficability; seasonal high water table; clayey subsoil; high soil moisture; flooding.	Poor: clayey subsoil; poorly drained.	Unsuited	Poor: thin surface layer; too clayey; poorly drained.

that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some terms have special meanings in soil science that may not be familiar to engineers. The Glossary defines many of these terms.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system used by the SCS engineers, Department of Defense, and others and the AASHTO system adopted by the American Association of State Highway and Transportation Officials (*2, 3, 6*).

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic matter (*3*). Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between

interpretations—Con.

Impoundments		Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Pond reservoir areas	Embankments and dikes				
Seasonal high water table; slow permeability; seepage.	Medium to high compressibility; medium piping hazard; fair compaction.	Somewhat poorly drained; slow permeability; flooding.	Medium available water capacity; slow intake rate; seasonal high water table; flooding.	Not applicable	Not applicable.
Moderate permeability.	Medium to high compressibility; medium piping hazard; fair to poor compaction.	Well drained	Medium available water capacity; moderate intake rate; slopes up to 25 percent; erodible.	Slopes commonly short and complex; slopes up to 25 percent; erodible.	Slopes of 15 to 25 percent; erodible.
Moderate permeability; seasonal high water table; seepage.	Medium to high compressibility and piping hazard; fair compaction.	Poorly drained; moderate permeability; flooding.	High available water capacity; moderate intake rate; flooding; high water table.	Not applicable	Not applicable.
Seasonal high water table; very slow permeability; seepage.	Medium to high compressibility; poor compaction.	Moderately well drained; very slow permeability.	Low available water capacity; slow intake rate; moderately well drained.	Very slow permeability; siltation of channels; erodible.	Moderately well drained; siltation of channels; low available water capacity; erodible.
Very slow permeability; seasonal high water table; seepage.	Medium to high compressibility; fair to poor compaction.	Somewhat poorly drained; very slow permeability.	Shallow rooting depth; slow intake rate; perched seasonal high water table; very slow permeability; low available water capacity; erodible; somewhat poorly drained.	Very slow permeability; cut channels clayey; siltation of channels; erodible.	Not applicable.
Moderately slow permeability; seepage; bedrock at a depth of 2 to 4 feet.	Medium to high compressibility; medium to high piping hazard; fair compaction.	Well drained	Low available water capacity; moderate intake rate; bedrock at a depth of 2 to 4 feet; slopes up to 60 percent; erodible.	Slopes commonly short; siltation of channels; bedrock at a depth of 2 to 4 feet; slopes up to 60 percent; erodible.	Slopes up to 60 percent; low available water capacity; siltation of channels.
Slow permeability; seasonal high water table; seepage.	Medium to high compressibility; fair to poor compaction.	Poorly drained; slow permeability; flooding.	Medium available water capacity; slow intake rate; slow permeability; flooding.	Not applicable	Not applicable.

two classes are designated by symbols for both classes; for example, CL-ML.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance (*2*). In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils, which have high bearing strength and are the best soils for subgrade, or foundation. At the other extreme, in group A–7, are clay soils, which have low strength when wet and are the poorest soils for sub-grade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The estimated AASHTO classification, without group index numbers, is given in table 5 for all soils mapped in the survey area.

Soil properties significant in engineering

Estimates of soil properties significant in engineering are given in table 5. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 5.

Depth to seasonal high water table is the distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Depth to bedrock is the distance from the surface of the soil to the upper surface of the rock layer.

Soil texture is described in table 5 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary.

Permeability is the quality that enables a soil to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 5 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks when dry or swells when wet. The extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Engineering interpretations

The estimated interpretations in table 6 are based on the engineering properties of soils shown in table 5, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of the survey area. Following are explanations of the columns in table 6.

Suitability of soils for winter grading depends on the ease with which soil can be moved and traversed by conventional construction equipment during cold weather. Slope, texture, depth to water table, susceptibility to formation of large frozen clods, and kind and amount of clay are features and qualities affecting a soil for winter grading.

Road fill is soil material used in embankments for roads. The suitability ratings reflect the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and the ease of excavating the material at borrow areas.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 6 provide guidance about where to look for probable sources. A soil rated as a *good* or *fair* source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, nor do they indicate quality of the deposit.

Topsoil is used for topdressing in areas where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, for example, in preparing a seedbed; either the natural fertility of the material or the response of plants when fertilizer is applied; and the absence of substances toxic to plants. Texture of the soil material and its content of stone fragments also affect suitability. Also considered in the ratings is damage that will result in the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for this purpose have low seepage, which is related to permeability and depth to fractured or permeable bedrock or other permeable material (fig. 9).

Embankments and dikes require soil material that is resistant to seepage and piping and has favorable stability, shrink-swell potential, shear strength, and compactibility. The presence of stones or organic material in a soil is among factors that are unfavorable.

Drainage for crops and pasture is affected by such soil properties as permeability, texture, and structure; depth to clay, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream overflow; and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion, or soil blowing; texture; content of stones; depth of root zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water available to plants; and need for drainage, or depth to water table or bedrock.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff and seepage so that water soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable

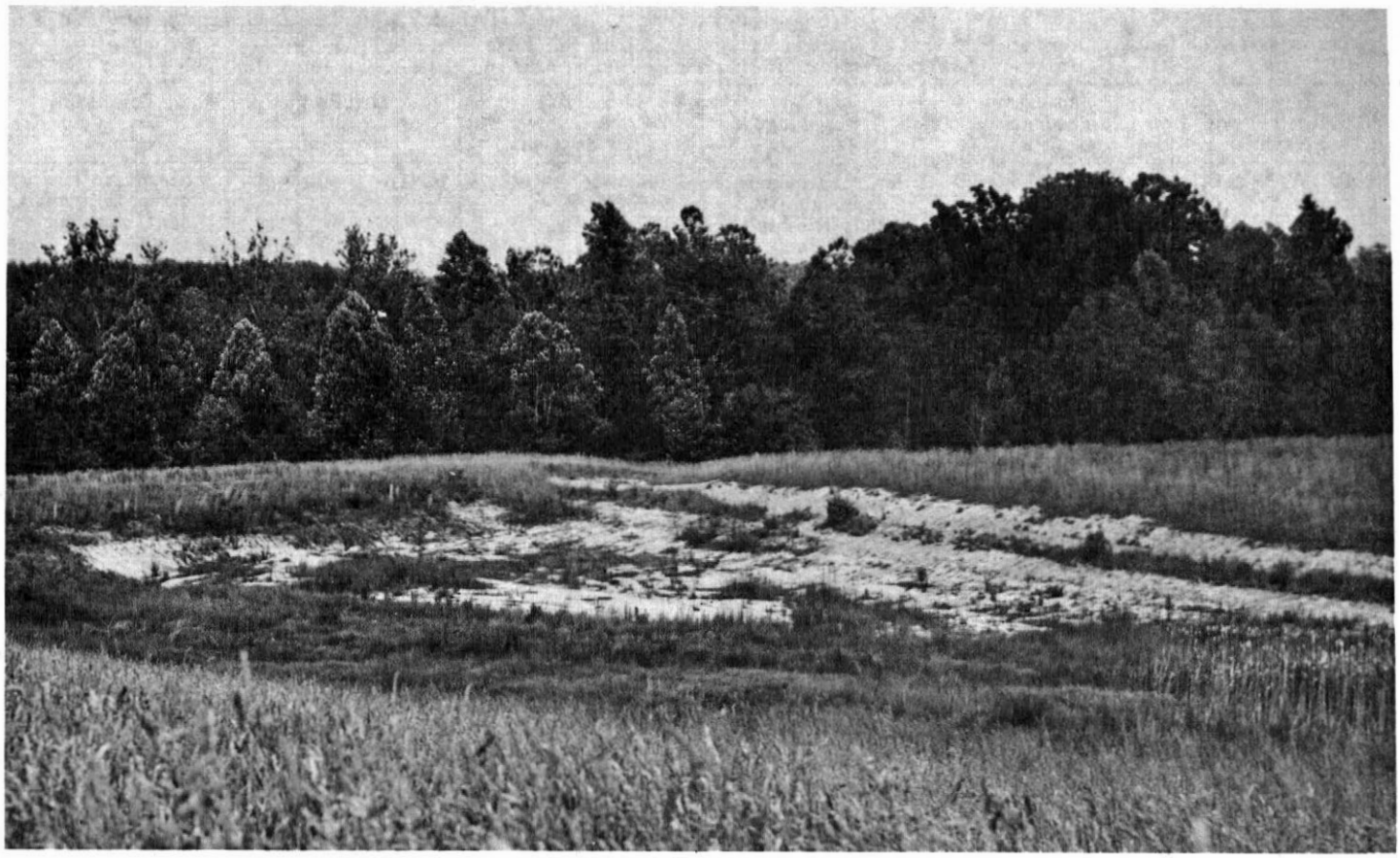


Figure 9.—Pond failure on Appling gravelly sandy loam, 6 to 15 percent slopes. Water seeps through permeable material in the floor of the pond.

material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is easy to vegetate.

Grassed waterway layout and construction are affected by such soil properties as the texture, depth, and erodibility of the soil material; the presence of stones or rock outcrop; and the steepness of slopes. Other factors affecting waterways are seepage, natural soil drainage, available water capacity, susceptibility to siltation, and ease of establishing and maintaining vegetation.

Town and Country Planning

This section was prepared chiefly for planners, developers, landscape architects, builders, zoning officials, realtors, landowners, and others interested in use of the soils in the survey area for purposes other than farming.

Soil and water losses in areas undergoing urbanization are often excessive. Construction of streets and roads, shopping centers, and large buildings; land shaping; and installation of water and sewage lines remove the vegetation from the soils and make them susceptible to erosion for long periods. Increased runoff and downstream siltation extend the damage far beyond the construction area. Soil and water losses in these areas can be reduced by adequate management during construction.

Contractors and developers should expose the smallest practical area of land for the shortest practical time. They should use temporary vegetation, mulching, or both where needed; use sediment basins to control siltation; control increased runoff; and retain and protect natural vegetation.

Table 7 shows the estimated degree and kinds of limitations of the soils in the survey area for septic tank absorption fields; sewage lagoons; shallow excavations; dwellings with and without basements; sanitary landfills; local roads and streets; lawns, gardens, and landscaping; playgrounds; camp areas; and picnic areas. The degree of limitation is indicated by the ratings *slight, moderate,* and *severe.* A limitation of *slight* means that soil properties are generally favorable and limitations are so minor that they can be easily overcome. A *moderate* limitation can be overcome or modified by planning, by design, or by special maintenance. A *severe* limitation means that costly soil reclamation, special design, intense maintenance, or a combination of these is required.

Septic tank absorption fields are subsurface systems

TABLE 7.—*Estimated degree and kinds of*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series that appear in the first column of this table. Too variable to

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
Abell: AbB, AeB	Severe: moderately well drained.	Severe: moderate permeability; seasonal high water table.	Moderate: wetness.	Severe: seasonal high water table.	Moderate: low strength; seasonal high water table.
*Appling: AgB, ApB	Moderate:[2] moderate permeability.	Moderate:[2] slope; moderate permeability.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
AgC, ApC2	Moderate:[2] slope; moderate permeability.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.
AwE2, AxE2 For Wedowee part of AwE2 and AxE2, see Wedowee series.	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Augusta Mapped only with Wahee soil.	Severe:[2] somewhat poorly drained; flooding.	Severe:[2] seasonal high water table; flooding.	Severe: somewhat poorly drained; flooding.	Severe: somewhat poorly drained; flooding; seasonal high water table.	Severe: seasonal high water table; flooding.
Bremo: BrD	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.
BrE, BrF	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: slope
Brockroad Mapped only with Georgeville soil.	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
Buncombe: Bu	Severe: flooding	Severe: rapid permeability; flooding.	Severe: too sandy; flooding.	Severe: flooding	Severe: flooding
Cecil: CcB2	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
CcC2	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell; potential; slope.
CcE2	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
CdC	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.

limitations to be considered in community planning

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the estimate are: Cut and fill land; Rock outcrop; Quarry, mine; Urban land; and Urban land complexes]

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe: seasonal high water table.	Moderate: flooding; excessive clay and silt.	Slight	Moderate: slope	Slight	Slight.
Moderate:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential.	Slight	Moderate: slope; coarse fragments in AgB.	Slight	Slight.
Moderate:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate:[2] clayey subsoil.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] seasonal high water table; flooding.	Severe: flooding	Moderate: somewhat poorly drained; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Moderate: somewhat poorly drained; flooding.
Severe: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.	Severe: slope	Moderate: slope	Moderate: slope.
Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe: rapid permeability; flooding.	Severe: flooding	Severe: too sandy; flooding.	Severe: too sandy.	Severe: flooding	Moderate: too sandy; flooding.
Severe:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] clayey subsoil; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Severe: cobbles in surface layer.	Severe: cobbles in surface layer; slope.	Severe: cobbles in surface layer; slope.	Severe: cobbles in surface layer; slope.

TABLE 7.—*Estimated degree and kinds of*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
CeB3	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
CeD3	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.
CeE3	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
*Chewacla: Ch, CT. For Toccoa part of CT, see Toccoa series.	Severe: somewhat poorly drained; flooding.	Severe: seasonal high water table; flooding.	Severe: somewhat poorly drained; flooding.	Severe: somewhat poorly drained; seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Cullen:					
CuB	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
CuC2	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.
CuE2	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
CxB3	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
CxC3	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.
CxE3	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Dogue:					
DoA	Severe: moderately well drained; moderately slow permeability; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; clayey subsoil; flooding.	Severe: flooding	Severe: flooding
DoB	Severe: moderately well drained; moderately slow permeability.	Severe: seasonal high water table; slope.	Severe: seasonal high water table; clayey subsoil.	Moderate:[3] moderately well drained; moderate shrink-swell potential.	Moderate:[3] moderate shrink-swell potential.
Elbert: Eb	Severe: poorly drained; slow to very slow permeability; flooding.	Severe: seasonal high water table; flooding.	Severe: poorly drained; clayey subsoil; flooding.	Severe: poorly drained; high shrink-swell potential; flooding.	Severe: poorly drained; high shrink-swell potential; flooding.
Enon:					
EnB	Severe:[2] slow permeability.	Moderate:[2] bedrock at a depth of 3½ to 5 feet; slope.	Severe: plastic, clayey subsoil.	Severe: moderate shrink-swell potential.	Severe: moderate shrink-swell potential.
EnC2	Severe:[2] slow permeability.	Severe:[2] slope	Severe: plastic, clayey subsoil.	Severe: high shrink-swell potential.	Severe: high shrink-swell potential.

limitations to be considered in community planning—Con.

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential.	Moderate: clay loam surface layer.	Moderate: clay loam surface layer.	Moderate: clay loam surface layer.	Moderate: clay loam surface layer.
Severe:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: clay loam surface layer; slope.	Severe: slope	Moderate: clay loam surface layer; slope.	Moderate: clay loam surface layer; slope.
Severe:[2] clayey subsoil; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: seasonal high water table; moderate permeability; flooding.	Severe: too silty; flooding.	Moderate: flooding.	Severe: somewhat poorly drained; flooding.	Severe: flooding	Moderate: somewhat poorly drained; flooding.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] clayey subsoil.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Moderate: clay loam; surface layer.	Moderate: clay loam surface layer; slope.	Moderate: clay loam surface layer.	Moderate: clay loam surface layer.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Moderate: clay loam surface layer; slope.	Severe: slope	Moderate: clay loam surface layer; slope.	Moderate: clay loam surface layer; slope.
Severe:[2] clayey subsoil.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: seasonal high water table; clayey subsoil; flooding.	Severe: flooding	Slight[3]	Moderate:[3] moderately slow permeability.	Moderate:[3] moderately slow permeability.	Slight.[4]
Severe: seasonal high water table; clayey subsoil.	Moderate:[3] clayey subsoil; moderate shrink-swell potential.	Slight[3]	Moderate:[3] moderately slow permeability.	Moderate:[3] moderately slow permeability.	Slight.[4]
Severe: poorly drained; high shrink-swell potential; flooding.	Severe: poorly drained; clayey subsoil; high shrink-swell potential; flooding.	Severe: poorly drained; clayey subsoil; high shrink-swell potential; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; slow to very slow permeability; flooding.	Severe: poorly drained; flooding.
Severe:[2] plastic, clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Severe: plastic, clayey subsoil; moderate shrink-swell potential.	Slight	Moderate: slow permeability; slope.	Moderate: slow permeability.	Slight.
Severe:[2] plastic, clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Severe: plastic, clayey subsoil; high shrink-swell potential.	Moderate: slope	Severe: slope	Moderate: slow permeability; slope.	Moderate: slope.

TABLE 7.—*Estimated degree and kinds of*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
Fluvanna:					
FlB2	Severe: moderately slow permeability.	Moderate: slope	Severe: clayey subsoil.	Severe: clayey subsoil.	Severe: clayey subsoil.
FlC2	Severe: moderately slow permeability; slope.	Severe: slope	Severe: clayey subsoil.	Severe: clayey subsoil.	Severe: clayey subsoil.
FlE2	Severe: slope	Severe: slope	Severe: slope	Severe: clayey subsoil.	Severe: clayey subsoil.
Forestdale: Fo	Severe: poorly drained; very slow permeability; flooding.	Severe: seasonal high water table; flooding.	Severe: poorly drained; clayey subsoil; flooding.	Severe: poorly drained; high shrink-swell potential; flooding.	Severe: very slow permeability; seasonal high water table; poorly drained; high shrink-swell potential; flooding.
*Georgeville:					
GeB2, GrB For Brockroad part of GrB, see Brockroad series.	Moderate: [2] moderate permeability.	Moderate: [2] moderate permeability; slope.	Moderate: clayey subsoil.	Slight	Slight
GeC2	Moderate: [2] moderate permeability; slope.	Severe: [2] slope	Moderate: clayey subsoil; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.
GeE2	Severe: [2] slope	Severe: [2] slope	Severe: slope	Severe: slope	Severe: slope
Gwinnett variant:					
GwB	Moderate: [2] moderate permeability.	Moderate: [2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: clayey subsoil.	Moderate: clayey subsoil.
GwC	Moderate: [2] moderate permeability; slope.	Severe: [2] slope	Moderate: clayey subsoil; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.
Helena:					
HaB	Severe: moderately well drained; slow permeability.	Moderate: slope	Severe: seasonal high water table; plastic, clayey subsoil.	Severe: seasonal high water table; moderate shrink-swell potential.	Severe: moderate shrink-swell potential.
HaC	Severe: moderately well drained; slow permeability.	Severe: slope	Severe: seasonal high water table; plastic, clayey subsoil.	Severe: seasonal high water table; high shrink-swell potential.	Severe: high shrink-swell potential.
Herndon:					
HdB	Moderate: [2] moderate permeability.	Moderate: [2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: clayey subsoil.	Moderate: clayey subsoil.
HdC	Moderate: [2] moderate permeability; slope.	Severe: [2] slope	Moderate: clayey subsoil; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.

limitations to be considered in community planning—Con.

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe:[2] clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: poorly drained; seasonal high water table; clayey subsoil; flooding.	Severe: poorly drained; clayey subsoil; high shrink-swell potential; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; very slow permeability; flooding.	Severe: poorly drained; very slow permeability; flooding.	Severe: poorly drained; flooding.
Slight	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Moderate: slope	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] slope	Severe: clayey subsoil.	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Slight	Severe: clayey subsoil.	Moderate: clay loam surface layer.	Moderate: clay loam surface layer; slope.	Moderate: clay loam surface layer.	Moderate: clay loam surface layer.
Moderate: slope	Severe: clayey subsoil.	Moderate: clay loam surface layer; slope.	Severe: slope	Moderate: clay loam surface layer; slope.	Moderate: clay loam surface layer; slope.
Severe: seasonal high water table; plastic, clayey subsoil.	Severe: plastic, clayey subsoil; moderate shrink-swell potential.	Slight	Moderate: slow permeability; slope.	Moderate: slow permeability.	Slight.
Severe: seasonal high water table; plastic, clayey subsoil.	Severe: plastic, clayey subsoil; high shrink-swell potential.	Moderate: slope	Severe: slope	Moderate: slow permeability; slope.	Moderate: slope.
Slight	Moderate: clayey subsoil; slope.	Slight	Moderate: slope	Slight	Slight.
Moderate: slope	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.

TABLE 7.—*Estimated degree and kinds of*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
Hiwassee:					
HwB2	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
HwC2	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.
HwE2	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Iredell:					
IrB, IrB2	Severe: moderately well drained to somewhat poorly drained; slow permeability.	Moderate: bedrock at a depth of 3½ to 5 feet; slope.	Severe: seasonal high water table; plastic, clayey subsoil.	Severe: seasonal high water table; high shrink-swell potential.	Severe: high shrink-swell potential.
IrC, IrC2	Severe: moderately well drained to somewhat poorly drained; slow permeability.	Severe: slope	Severe: seasonal high water table; plastic, clayey subsoil.	Severe: seasonal high water table; high shrink-swell potential.	Severe: high shrink-swell potential.
Louisburg:					
LoD	Severe: bedrock at a depth of 2 to 4 feet.	Severe: rapid permeability; bedrock at a depth of 2 to 4 feet; slope.	Severe: bedrock at a depth of 2 to 4 feet.	Severe: bedrock at a depth of 2 to 4 feet.	Moderate: bedrock at a depth of 2 to 4 feet; slope.
LoE, LoF	Severe: bedrock at a depth of 2 to 4 feet; slope.	Severe: rapid permeability; bedrock at a depth of 2 to 4 feet; slope.	Severe: bedrock at a depth of 2 to 4 feet; slope.	Severe: bedrock at a depth of 2 to 4 feet; slope.	Severe: slope
Madison:					
MaB2	Moderate:[2] moderate permeability; bedrock at a depth of 3 feet or more.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil; bedrock at a depth of 3 feet or more.	Moderate: moderate shrink-swell potential; bedrock at a depth of 3 feet or more.	Moderate: moderate shrink-swell potential.
MaC2	Moderate:[2] moderate permeability; bedrock at a depth of 3 feet or more; slope.	Severe:[2] slope	Moderate: clayey subsoil; bedrock at a depth of 3 feet or more; slope.	Moderate: moderate shrink-swell potential; bedrock at a depth of 3 feet or more; slope.	Moderate: moderate shrink-swell potential; slope.
MaE2	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Manteo:					
McD	Severe: bedrock at a depth of 1 foot to 1½ feet.	Severe: moderately rapid permeability; bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet.	Severe: bedrock at a depth of 1 foot to 1½ feet.	Severe: bedrock at a depth of 1 foot to 1½ feet.
McE, McF, MNE. Rock outcrop part of MNE is not included.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: moderately rapid permeability; bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.

limitations to be considered in community planning—Con.

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe: clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] clayey subsoil.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: seasonal high water table; bedrock at a depth of 3½ to 5 feet; plastic, clayey subsoil.	Severe: plastic, clayey subsoil; high shrink-swell potential.	Moderate: moderately well drained to somewhat poorly drained.	Moderate: slow permeability; slope.	Moderate: slow permeability.	Moderate: moderately well drained to somewhat poorly drained.
Severe: seasonal high water table; bedrock at a depth of 3½ to 5 feet.	Severe: plastic, clayey subsoil; high shrink-swell potential.	Moderate: moderately well drained to somewhat poorly drained; slope.	Severe: slope	Moderate: slope	Moderate: moderately well drained to somewhat poorly drained; slope.
Severe: rapid permeability; bedrock at a depth of 2 to 4 feet.	Moderate: bedrock at a depth of 2 to 4 feet.	Moderate: bedrock at a depth of 2 to 4 feet; slope.	Severe: slope	Moderate: slope	Moderate: slope.
Severe: rapid permeability; bedrock at a depth of 2 to 4 feet; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] clayey subsoil; bedrock at a depth of 3 feet or more.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] clayey subsoil; bedrock at a depth of 3 feet or more.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] clayey subsoil.	Severe: clayey subsoil; slope.	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Severe: moderately rapid permeability; bedrock at a depth of 1 foot to 1½ feet.	Severe: bedrock at a depth of 1 foot to 1½ feet.	Severe: bedrock at a depth of 1 foot to 1½ feet.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet.	Severe: bedrock at a depth of 1 foot to 1½ feet.
Severe: moderately rapid permeability; bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.	Severe: bedrock at a depth of 1 foot to 1½ feet; slope.

TABLE 7.—*Estimated degree and kinds of*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
Masada:					
MpB, MrB, MsB2, MtB.[3]	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
MpC, MrC MsC2	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.
Mayodan:					
MwB, MyB2	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil.	Moderate: clayey subsoil.	Moderate: clayey subsoil.
MwC, MyC2	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: clayey subsoil; slope.	Moderate: clayey subsoil; slope.
Mecklenburg:					
MzB2	Severe:[2] slow permeability.	Moderate:[2] slope	Moderate: clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential.	Moderate: clayey subsoil; moderate shrink-swell potential.
MzC2	Severe:[2] slow permeability.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.
MzE2	Severe:[2] slow permeability; slope.	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Nason:					
NaB	Severe:[2] bedrock at a depth of 3½ to 5 feet.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Moderate: clayey subsoil; moderate shrink-swell potential; bedrock at a depth of 3½ to 5 feet.	Moderate: clayey subsoil; moderate shrink-swell potential.
NaC	Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe:[2] slope	Moderate: clayey subsoil; bedrock at a depth of 3½ to 5 feet; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; bedrock at a depth of 3½ to 5 feet; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.
NaE	Severe:[2] bedrock at a depth of 3½ to 5 feet; slope.	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Penn:					
PeA	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.
PeB	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.
PeC	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.

limitations to be considered in community planning—Con.

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Slight	Moderate: slope; coarse fragments in MrB.	Slight	Slight.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate: clayey subsoil.	Moderate: clayey subsoil; moderate shrink-swell potential.	Slight	Moderate: slope	Slight	Slight.
Moderate: clayey subsoil; slope.	Moderate: clayey subsoil; moderate shrink-swell potential.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Slight	Moderate: slow permeability; slope.	Moderate: slow permeability.	Slight.
Severe:[2] clayey subsoil.	Severe: clayey subsoil; slope.	Moderate: slope	Severe: slope	Moderate: slow permeability; slope.	Moderate: slope.
Severe:[2] clayey subsoil.	Severe: clayey subsoil; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Slight	Slight.
Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.	Slight	Slight.
Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.	Severe: slope	Moderate: slope	Moderate: slope.

TABLE 7.—*Estimated degree and kinds of*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
Penn part of PpE—Mapped only with Pinkston soil.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: slope
*Pinkston: PkB	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.
PkD	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Severe: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.
PpE—For Penn part, see Penn series.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: bedrock at a depth of 2 to 3½ feet; slope.	Severe: slope
Riverview: Re	Severe:[2] flooding	Severe:[2] seepage; flooding.	Severe: flooding	Severe: flooding	Severe: flooding
Roanoke: Ro	Severe: poorly drained; slow permeability; flooding.	Severe: seasonal high water table; flooding.	Severe: poorly drained; seasonal high water table; clayey subsoil; flooding.	Severe: poorly drained; seasonal high water table; flooding.	Severe: poorly drained; seasonal high water table; flooding.
State: StA	Severe:[2] flooding	Severe:[2] moderately rapid permeability; flooding.	Severe: flooding	Severe: flooding	Severe: flooding
StB	Severe:[2] flooding	Severe:[2] moderately rapid permeability; flooding.	Severe: flooding	Severe: flooding	Severe: flooding
Tallapoosa: TaD	Severe: bedrock at a depth of 2 to 5 feet.	Severe: bedrock at a depth of 2 to 5 feet; slope.	Severe: bedrock at a depth of 2 to 5 feet.	Severe: bedrock at a depth of 2 to 5 feet.	Moderate: slope
TaE TaF	Severe: bedrock at a depth of 2 to 5 feet; slope.	Severe: bedrock at a depth of 2 to 5 feet; slope.	Severe: bedrock at a depth of 2 to 5 feet; slope.	Severe: bedrock at a depth of 2 to 5 feet; slope.	Severe: slope
Tatum: TlB	Severe:[2] bedrock at a depth of 3½ to 5 feet.	Moderate:[2] moderate permeability; slope.	Moderate: clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Moderate: clayey subsoil; moderate shrink-swell potential; bedrock at a depth of 3½ to 5 feet.	Moderate: clayey subsoil; moderate shrink-swell potential.
TlC2, TmD3	Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe:[2] slope	Moderate: clayey subsoil; bedrock at a depth of 3½ to 5 feet; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; bedrock at a depth of 3½ to 5 feet; slope.	Moderate: clayey subsoil; moderate shrink-swell potential; slope.

limitations to be considered in community planning—Con.

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe: moderate to moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet.	Slight	Slight.
Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.	Moderate: bedrock at a depth of 2 to 3½ feet; slope.	Severe: slope	Moderate: slope	Moderate: slope.
Severe: moderately rapid permeability; bedrock at a depth of 2 to 3½ feet.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] flooding	Severe: flooding	Severe:[2] flooding	Severe: flooding	Severe: flooding	Moderate: flooding.
Severe: poorly drained; seasonal high water table; clayey subsoil; flooding.	Severe: poorly drained; clayey subsoil; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.
Severe:[2] moderately rapid permeability; flooding.	Severe:[2] flooding	Moderate: flooding.	Moderate: flooding.	Severe: flooding	Moderate: flooding.
Severe:[2] moderately rapid permeability; flooding.	Severe:[2] flooding	Moderate: flooding.	Moderate: flooding; slope.	Severe: flooding	Moderate: flooding.
Severe: bedrock at a depth of 2 to 5 feet.	Moderate: bedrock at a depth of 2 to 5 feet; too silty.	Moderate: bedrock at a depth of 2 to 5 feet; slope.	Severe: slope	Moderate: slope	Moderate: slope.
Severe: bedrock at a depth of 2 to 5 feet; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.

TABLE 7.—*Estimated degree and kinds of*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
TlE2, TmE3	Severe:[2] bedrock at a depth of 3½ to 5 feet; slope.	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Toccoa: To	Severe:[2] flooding	Severe:[2] moderately rapid permeability; flooding.	Severe: flooding	Severe: flooding	Severe: flooding
Turbeville: TuB	Moderate:[2] moderate permeability.	Moderate:[2] moderate permeability; slope.	Severe: clayey subsoil.	Severe: clayey subsoil.	Severe: clayey subsoil.
TuC2	Moderate:[2] moderate permeability; slope.	Severe:[2] slope	Severe: clayey subsoil; slope.	Severe: clayey subsoil; slope.	Severe: clayey subsoil; slope.
Vance: VaB, VaB2	Severe:[2] slow permeability.	Moderate:[2] slope	Moderate: clayey subsoil.	Moderate: moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.
VaC2	Severe:[2] slow permeability; slope.	Severe:[2] slope	Moderate: clayey subsoil; slope.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; slope.
*Wahee: Wa For Augusta part, see Augusta series.	Severe:[2] slow permeability; somewhat poorly drained; flooding.	Severe:[2] seasonal high water table; flooding.	Severe: somewhat poorly drained; flooding.	Severe: somewhat poorly drained; seasonal high water table; flooding.	Severe: seasonal high water table; flooding.
Wedowee Mapped only with Appling soil.	Severe:[2] slope	Severe:[2] slope	Severe: slope	Severe: slope	Severe: slope
Wehadkee: Wd	Severe:[2] poorly drained; flooding.	Severe:[2] seasonal high water table; flooding.	Severe: poorly drained; seasonal high water table; flooding.	Severe: poorly drained; seasonal high water table; flooding.	Severe: poorly drained; seasonal high water table; flooding.
White Store: WeA, WgA	Severe: moderately well drained; very slow permeability; bedrock at a depth of 3½ to 5 feet.	Moderate: bedrock at a depth of 3½ to 5 feet.	Severe: seasonal high water table; plastic, clayey subsoil.	Severe: seasonal high water table; high shrink-swell potential.	Severe: high shrink-swell potential.
WeB, WgB	Severe: moderately well drained; very slow permeability; bedrock at a depth of 3½ to 5 feet.	Moderate: bedrock at a depth of 3½ to 5 feet; slope.	Severe: seasonal high water table; plastic, clayey subsoil.	Severe: seasonal high water table; high shrink-swell potential.	Severe: high shrink-swell potential.
White Store variant: WhA	Severe:[2] very slow permeability; somewhat poorly drained; bedrock at a depth of 3½ to 5 feet.	Moderate:[2] seasonal high water table; bedrock at a depth of 3½ to 5 feet.	Severe: plastic, clayey subsoil; somewhat poorly drained.	Severe: high shrink-swell potential; somewhat poorly drained; seasonal high water table.	Severe: high shrink-swell potential; seasonal high water table.

limitations to be considered in community planning—Con.

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe:[2] bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe:[2] flooding	Severe: flooding	Moderate: flooding.	Severe: flooding	Severe: flooding	Moderate: flooding.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Slight	Moderate: slope	Slight	Slight.
Severe:[2] clayey subsoil.	Severe: clayey subsoil.	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[2] seasonal high water table; flooding.	Severe: clayey subsoil; flooding.	Moderate: somewhat poorly drained; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding.	Severe: somewhat poorly drained; flooding.
Moderate:[2] clayey subsoil.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: poorly drained; seasonal high water table; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.
Severe: seasonal high water table; plastic, clayey subsoil.	Severe: plastic, clayey subsoil; high shrink-swell potential.	Moderate: seasonal high water table.	Severe: very slow permeability.	Severe: very slow permeability.	Slight.
Severe: seasonal high water table; plastic, clayey subsoil; bedrock at a depth of 3½ to 5 feet.	Severe: plastic, clayey subsoil; high shrink-swell potential.	Moderate: seasonal high water table.	Severe: very slow permeability.	Severe: very slow permeability.	Slight.
Severe:[2] plastic, clayey subsoil; seasonal high water table; bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil; high shrink-swell potential.	Moderate: somewhat poorly drained.	Severe: very slow permeability; seasonal high water table.	Severe: very slow permeability; seasonal high water table.	Moderate: somewhat poorly drained.

TABLE 7.—*Estimated degree and kinds of*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements [1]	Dwellings without basements [1]
WhB	Severe:[2] very slow permeability; somewhat poorly drained; bedrock at a depth of 3½ to 5 feet.	Moderate:[2] seasonal high water table; bedrock at a depth of 3½ to 5 feet; slope.	Severe: plastic, clayey subsoil; somewhat poorly drained.	Severe: high shrink-swell potential; somewhat poorly drained; seasonal high water table.	Severe: high shrink-swell potential; seasonal high water table.
Wilkes: WkB	Severe:[2] moderately slow permeability; bedrock at a depth of 2 to 4 feet.	Severe:[2] bedrock at a depth of 2 to 4 feet.	Severe: bedrock at a depth of 2 to 4 feet.	Severe: bedrock at a depth of 2 to 4 feet.	Moderate: bedrock at a depth of 2 to 4 feet.
WkD	Severe:[2] moderately slow permeability; bedrock at a depth of 2 to 4 feet.	Severe:[2] bedrock at a depth of 2 to 4 feet; slope.	Severe: bedrock at a depth of 2 to 4 feet.	Severe: bedrock at a depth of 2 to 4 feet.	Moderate: bedrock at a depth of 2 to 4 feet; slope.
WkE, WkF, WlE3	Severe:[2] moderately slow permeability; bedrock at a depth of 2 to 4 feet.	Severe:[2] bedrock at a depth of 2 to 4 feet; slope.	Severe: bedrock at a depth of 2 to 4 feet; slope.	Severe: bedrock at a depth of 2 to 4 feet; slope.	Severe: slope
Worsham: WoB	Severe: poorly drained; slow permeability; flooding.	Severe: seasonal high water table; flooding.	Severe: seasonal high water table; flooding; poorly drained; clayey subsoil.	Severe: poorly drained; seasonal high water table; flooding.	Severe: poorly drained; seasonal high water table; flooding.

[1] Small industrial, institutional, or commercial buildings.
[2] Possible hazard of ground water pollution or pollution to nearby streams.

of tile or perforated pipe that distribute effluent from a septic tank into natural soil (*11*). The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope affects difficulty of layout and construction and also the risk of erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor and sides, or embankments, of compacted soil material. It is assumed that the embankment is compacted to medium density and the pond is protected from flooding. The properties considered are those that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic-matter content, and slope. If the floor needs to be leveled, depth to and nature of bedrock becomes important. Soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified soil classification and the number of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or trenching to a depth of 6 feet or less, as for example, excavations for pipelines, sewer lines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrop or big stones, and freedom from flooding or a high water table.

Dwellings, as rated in table 7, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill refers to a method of disposing of refuse. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period.

limitations to be considered in community planning—Con.

Sanitary landfills (trench type)	Local roads and streets	Lawns, gardens, and landscaping	Playgrounds (athletic fields)	Camp areas	Picnic areas
Severe:[3] plastic, clayey subsoil; seasonal high water table; bedrock at a depth of 3½ to 5 feet.	Severe: clayey subsoil; high shrink-swell potential.	Moderate: somewhat poorly drained.	Severe: very slow permeability; seasonal high water table.	Severe: very slow permeability; seasonal high water table.	Moderate: somewhat poorly drained.
Severe:[3] bedrock at a depth of 2 to 4 feet.	Severe: clayey subsoil; high shrink-swell potential.	Moderate: bedrock at a depth of 2 to 4 feet.	Moderate: slope	Slight	Slight.
Severe:[3] bedrock at a depth of 2 to 4 feet.	Severe: clayey subsoil; high shrink-swell potential.	Moderate: bedrock at a depth of 2 to 4 feet; slope.	Severe: slope	Moderate: slope	Moderate: slope.
Severe:[3] bedrock at a depth of 2 to 4 feet; slope.	Severe: clayey subsoil; high shrink-swell potential; slope.	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: poorly drained; seasonal high water table; clayey subsoil; flooding.	Severe: poorly drained; clayey subsoil; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.	Severe: poorly drained; flooding.

[3] Ratings are severe if this soil is subject to flooding.
[4] Rating is moderate if this soil is subject to flooding.

Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated the ratings in table 7 apply only to a depth of about 6 feet, and therefore limitation ratings of *slight* or *moderate* may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 or 15 feet, but every site should be investigated before it is selected.

Local roads and streets, as rated in table 7, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are the load-supporting capacity and stability of the subgrade and the workability and quantity of cut and fill material available. The AASHTO and Unified classifications of the soil material and also the shrink-swell potential indicate traffic-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

The limitations for lawns, gardens, and landscaping are based on slope, texture, hazard of flooding, and depth to the seasonal high water table. Trafficability is moderate. Soil at the site is used, and no fill or topsoil is imported. Traps or roughs are not considered as part of the golf fairways.

Establishing lawns, gardens, and landscape plantings in subdivisions or other built-up areas often involves special problems. Soil material excavated for foundations and basements is generally spread over the surrounding area. This spreading results in a range of textures in the surface layer, generally from loamy to clayey. In addition, the surface layer is often compacted by machinery and other traffic during construction. Lawns and recreation areas are subject to a variety of uses that compact the surface layer and wear away the grass cover.

Preparing a good seedbed, seeding adapted grasses, applying lime and fertilizer, watering as needed, and regulating use help in alleviating these problems.

Playgrounds require soils that can withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrop, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rain but not dusty when dry. If grading and leveling are required, depth to rock is important.

Camp areas are subject to heavy foot traffic and limited vehicular traffic. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rain but not dusty when dry.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry, are free from flooding during the season of use, and are not so sloping or stony that cost of leveling sites or of building access roads is greatly increased.

Formation and Classification of the Soils

This section describes factors of soil formation and their effect on the soils in Campbell County and the city of Lynchburg. It also describes the national soil classification system and assigns the soils to the higher categories of this system.

Formation of Soils

The five major factors responsible for the formation of soils are parent material, relief, climate, plants and animals, and time. Climate and plants and animals are the active forces in soil formation. Their effect on the parent material is modified by relief and by the length of time the parent material has been in place. In some areas one factor dominates in the formation of a soil and determines most of its properties, but normally the interaction of all factors determines the kind of soil that forms.

Parent material

The two broad classes of parent material in the survey area are residual material and transported material. Residual material has weathered in place from the underlying rocks. Transported material, alluvium and colluvium, was carried by water or was moved by gravity and was laid down as unconsolidated deposits of clay, silt, sand, and fragments of rock. The characteristics of residual material are related directly to the characteristics of the underlying rocks. Those of transported material are related to the characteristics of the soils or rocks from which this material was washed or from which it was rolled.

The rocks of the survey area are mostly of the Precambrian, Paleozoic, or Triassic periods (*4, 5*). Igneous, metamorphic, and sedimentary rocks occur and are sources of parent material for the soils.

Igneous and metamorphic rocks of igneous origin are classed as acidic or basic, depending on the amount and type of minerals that make up the rocks. Acidic rocks, such as granite, gneiss, rhyolite, and quartzite, weathered into parent material for Appling, Cecil, Georgeville, Louisburg, Nason, Tallapoosa, Tatum, and other soils.

Basic and mixed basic acidic rocks, such as diorite, gneiss, diabase, greenstone, and gabbro, weathered into parent material for Cullen, Enon, Fluvanna, Gwinnett, Helena, Iredell, Wilkes, and other soils.

Sedimentary rocks of Triassic age, such as sandstone and shale, weathered into parent material for such soils as Penn, Pinkston, Rapidan, White Store, and other soils.

Buncombe, Chewacla, Toccoa, Wehadkee, and other soils formed in transported material on first bottoms. Soils formed in transported material on stream terraces include Augusta, Forestdale, Hiwassee, Masada, Turbeville, Wahee, and other soils. Those formed in colluvium or local alluvium are Abell and Worsham soils.

Many characteristics of a soil can be traced directly to the parent material. These include the texture, the mineral content, the base saturation, the kind and quantity of clay, the number of coarse fragments, and the color, drainage, natural fertility, and reaction.

Relief

Relief, or lay of the land, affects the formation of soils by causing differences in infiltration of water and runoff, in internal drainage, in soil temperature, and in geologic erosion. It can alter the effects of parent material on the formation of soils to the extent that several different kinds of soil can form from the same kind of parent material. Relief also affects the amount of radiant energy absorbed by soils, and this energy, in turn, affects the native vegetation.

In Campbell County and the city of Lynchburg, relief ranges from nearly level to steep. In steep soils the effects of relief are rapid runoff, little percolation of water through the soil, little movement of clay, little translocation of soil bases, and severe erosion that removes weathered rock and soil material as rapidly as they form. Bremo and Louisburg soils are slopng to steep and have weakly expressed horizons. Gently sloping and sloping soils are commonly well drained, and geologic erosion is generally slight. The soils are mature and have well-defined horizons. They include such soils as Cecil, Cullen, Tatum, and Turbeville soils. Nearly level soils in low areas or depressions are wet, are often ponded, and are poorly drained. Mottled soils, such as Elbert and Worsham soils, formed in such areas. In low areas on flood plains the soils are wet because they are flooded frequently and have a seasonal high water table. Wehadkee soils occur in such areas. They are gray and are mottled because of the excess water.

Climate

Climate is important in the formation of soils because it influences the weathering of minerals. Weathering is more rapid under a warm and humid climate than it is under a cold and dry climate. The type and abundance of vegetation are influenced by the amount of precipitation and the length of the growing season. Precipitation also affects the translocation and leaching of some weathered material. Hard rains and frequent showers can cause excessive erosion.

Campbell County and the city of Lynchburg have a warm, humid, continental climate. The average temperature in summer is 75° F, and the average temperature in winter is 36°. The average amount of rainfall received annually is about 40 inches. Rainfall is well distributed throughout the year, but is slightly higher in spring and summer than in fall and winter.

The climate typical of this survey area favors intense leaching of soluble and colloidal material downward in many soils, such as Appling, Cecil, Cullen, Madison, Tatum, and other soils. Weathering and the translocation of material occur throughout most of the year. Leaching has kept free carbonates of lime from accumulating in the soils, although calcium is one of the mineral components of some of the underlying rocks.

When weathering breaks down the rocks, other forces of soil formation become active. All mature soils have well-developed horizons. Most of the soils are acid. The acidity ranges from very strongly acid to slightly acid.

The climate varies locally as a result of differences in the degree and direction of slopes and their position on the landscape. Although its effect is modified locally by relief, the climate is nearly uniform throughout the county. Therefore, this factor does not account for significant differences among the soils. A more detailed discussion of the climate of the survey area is under the heading "Environmental Factors Affecting Soil Use."

Plants and animals

Biologic forces have had an important role in the formation of the soils in Campbell County and the city of Lynchburg. Such plants and animals as trees, shrubs, grasses, other herbaceous plants, micro-organisms, and earthworms are active agencies in soil formation. The kinds of plants and animals that live on and in the soil are determined by environmental factors, including climate, parent material, relief, and age of the soil. If the climate or vegetation varies greatly, the kind of soil also varies.

Plants supply organic matter and transfer moisture and plant nutrients from the lower to the upper horizons. Organic matter decomposes and is mixed into the soil by the action of micro-organisms and earthworms or by chemical reaction. It has not accumulated in the soils of the survey area to any great extent. The rate of decomposition is fairly rapid because of the favorable temperature, the generally abundant moisture, the condition of the organic matter, and the favorable population of micro-organisms in the soils.

The original vegetation in this survey area was a dense forest of hardwoods or of hardwoods and pines. The density of the stands, the proportion of different species, and the kind of ground cover varied somewhat, but these variations do not account for all the differences in soil properties throughout the survey area. Deciduous trees commonly have deep roots. Their leaves vary in content of plant nutrients, but they generally return more bases and more phosphorus to the soil than the needles of coniferous trees.

As farming developed, the activity of man influenced soil formation. Forests were cleared, and new kinds of plants were introduced. Cultivation and artificial drainage as well as the application of lime and fertilizer changed some characteristics of the soils. Man's activity has caused an accelerated loss of soil through erosion. As a result, the soil in many areas has been thinned and has been otherwise changed. Some of the material washed from sloping areas has been deposited in depressions and on flood plains. Young or immature Riverview and Toccoa soils formed in such material.

Time

Time is important in the formation of soils. A soil is considered mature if the factors of soil formation have operated long enough to form well-drained, genetically related horizons and the soil is in equilibrium with its environment. Cecil, Cullen, and Turbeville soils are examples. A soil is considered immature if it shows little or no horizonation and the soil-forming processes are still active. Many soils range in maturity between these extremes.

Soils that formed in the same kind of parent material but in areas of different topography do not necessarily mature in the same length of time. In steep Manteo soils, for example, no definite horizons have had time to form because the soil has been removed by erosion almost as rapidly as it has formed. In less sloping soils, there has been enough time for soil formation. Nason soils are an example.

Soils formed in material resistant to weathering require more time to reach maturity than soils formed in easily weathered material. In soils on flood plains the formation of genetically related horizons can be slowed or prevented if alluvium is still being deposited. Toccoa soils are an example.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineer-

ing work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Because this system is under continual study, readers interested in developments of the current system should search the latest literature available (*7, 10*).

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped together. In table 8, the soil series of Campbell County and the city of Lynchburg are placed in three categories of the current system. Classes of the current system are briefly defined in the following paragraphs (*8*).

ORDER. Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions are the Entisols and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Ult-i-sol).

SUBORDER. Each order is divided into suborders that are based chiefly on those soil characteristics that seem

TABLE 8.—*Current classification of soils* [1]

Series	Family	Subgroup	Order
Abell	Fine-loamy, mixed, thermic	Aquic Hapludults	Ultisols.
Appling	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Augusta	Fine-loamy, mixed, thermic	Aeric Ochraquults	Ultisols.
Bremo [2]	Loamy-skeletal, mixed, thermic	Typic Dystrochrepts	Inceptisols.
Brockroad	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Buncombe	Mixed, thermic	Typic Udipsamments	Entisols.
Cecil	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Chewacla	Fine-loamy, mixed, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Cullen	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Dogue	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Elbert	Fine, montmorillonitic, mesic	Typic Ochraqualfs	Alfisols.
Enon	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Fluvanna	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Forestdale	Fine, montmorillonitic, thermic	Typic Ochraqualfs	Alfisols.
Georgeville	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Gwinnett variant	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Helena	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Herndon	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Hiwassee	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Iredell	Fine, montmorillonitic, thermic	Typic Hapludalfs	Alfisols.
Louisburg	Coarse-loamy, mixed, thermic	Ruptic-Ultic Dystrochrepts	Inceptisols.
Madison	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Manteo	Loamy-skeletal, mixed, thermic	Lithic Dystrochrepts	Inceptisols.
Masada	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Mayodan	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Mecklenburg	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Nason	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Penn	Fine-loamy, mixed, mesic	Ultic Hapludalfs	Alfisols.
Pinkston	Coarse-loamy, mixed, thermic	Ruptic-Ultic Dystrochrepts	Inceptisols.
Riverview [3]	Fine-loamy, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
Roanoke	Clayey, mixed, thermic	Typic Ochraquults	Ultisols.
State	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Tallapoosa	Loamy, micaceous, thermic, shallow	Ochreptic Hapludults	Ultisols.
Tatum	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Toccoa	Coarse-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Turbeville	Clayey, mixed, thermic	Typic Paleudults	Ultisols.
Vance	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Wahee [4]	Clayey, mixed, thermic	Aeric Ochraquults	Ultisols.
Wedowee	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Wehadkee	Fine-loamy, mixed, nonacid, thermic	Typic Fluvaquents	Entisols.
White Store	Fine, mixed, thermic	Vertic Hapludalfs	Alfisols.
White Store variant	Clayey, mixed, thermic	Aeric Ochraquults	Ultisols.
Wilkes	Loamy, mixed, thermic, shallow	Typic Hapludalfs	Alfisols.
Worsham	Clayey, mixed, thermic	Typic Ochraquults	Ultisols.

[1] Placement of some soil series in the current system of classification, especially in families, may change as more precise information becomes available.

[2] The Bremo soils in this survey area are taxadjuncts to the Bremo series because they are slightly acid or neutral.

[3] The Riverview soils in this survey area are taxadjuncts to the Riverview series because they overlie a buried soil, are slightly finer textured in the lower part than is typical, and have a higher pH.

[4] The Wahee soils in this survey area are taxadjuncts to the Wahee series because the solum is only 30 to 60 inches thick.

to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order. An example is *Udult* (*Ud* meaning humid and *ult,* from Ultisol).

GREAT GROUP. Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those having pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and dark-red and dark-brown colors associated with basic rocks. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder. An example is Hapludults (*Hapl,* meaning simple horizons, *ud* for humid, and *ult,* from Ultisols).

SUBGROUP. Great groups are divided into subgroups, one representing the central, or typic, segment of the group, and others called intergrades, which have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups also represent intergrades outside the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Hapludults (a typical Hapludult).

FAMILY. Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture and mineralogy, for example, that are used as family differentiae (see table 8). An example is the fine-loamy, mixed, thermic family of Typic Hapludults.

Environmental Factors Affecting Soil Use

This section gives general information about some of the factors that affect the present and future uses of the soils in the survey area.

Climate [5]

Campbell County and the city of Lynchburg are on the Southern Piedmont Plateau just east of the Blue Ridge Mountains. Summers are warm, winters are not unduly severe, and rainfall is normally adequate. The survey area is inland from the Atlantic Ocean, which has only a very slight moderating effect on the climate. Although the area is near the typical path of winter storms, the Appalachian Mountains to the west lessen their intensity.

Warm, moist air currents often move from the south or southwest, and cold, dry air currents move southward and eastward through the survey area. These alternating currents frequently bring sharp changes in the weather, such as seasonal temperature variations. Local differences in weather, such as lower temperatures in the valleys during clear, still nights in winter, can occur. Elevation does not vary enough, however, to cause significant differences in climate. Therefore, the climatological data in tables 9 and 10 may be considered approximately applicable to all of the survey area.

Average temperatures vary slightly from one year to another and are mostly 54° to 59°. Daily maximum temperatures are 90° or higher on an average of only 18 days per year. Temperatures of 32° or lower occur on about 90 days of the year. Temperatures above 100° or below 0° are extremely rare. Prolonged periods of very cold or very warm weather are unusual. Occasional mild spells occur in winter and periods of mild weather with lower humidities relieve stretches of warm, humid weather in summer. Spring begins in March and autumn in October.

The frost-free growing season is about 200 days. This growing season is long enough to allow proper maturity of a variety of crops. The grazing season is a little longer, but winter months are cold enough to require considerable feeding and shelter of livestock.

Precipitation is fairly evenly distributed throughout the year, but there is a distinct summertime maximum of rainfall, occasioned by afternoon thundershowers. Summertime rainfall, however, is often insufficient because moisture demands are greatest and evaporation is highest in summers. Dry spells of various lengths occur and occasionally are serious. The survey area is also subject to excessive rainfall on rare occasions. Considerable runoff and, during extremely wet periods, flooding along streams results.

The average annual relative humidity is 65 percent. The average relative humidity varies from about 59 percent in March to 74 percent in August. Relative humidity throughout the day generally varies inversely with the temperature. It averages about 78 percent early in the morning and about 52 percent early in the afternoon.

The prevailing wind direction is southwest, although winds from all directions occur. Late in summer and early in fall, north winds are slightly more frequent. Windspeeds average 8 miles per hour annually, ranging from 6.4 miles per hour in August to 9.4 miles per hour in March. Windspeeds are mostly moderate, but a few times a year windstorms cause scattered local damage in the survey area.

Clouds cover an average of 50 percent of the sky

[5] Prepared by M. H. BAILEY, Weather Bureau State climatologist, Agronomy Department, V.P.I., Blacksburg, Virginia.

TABLE 9.—*Temperature and precipitation data*

[All data from Lynchburg, Va., elevation 648 feet]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Two years in 10 will have at least four days with—		Average monthly total	One year in 10 will have—		Days with snow cover 1 inch or more	Average depth of snow on days with snow cover
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—		
	°F	°F	°F	°F	Inches	Inches	Inches	Number	Inches
January	46	29	64	12	3.3	1.3	4.8	6	3
February	48	30	65	15	2.7	1.2	4.6	5	5
March	56	35	73	22	3.6	1.7	5.8	2	6
April	67	45	85	32	3.1	1.5	4.7	(1)	1
May	77	54	89	42	3.2	1.4	5.9	0	--
June	84	62	93	53	4.1	1.9	7.2	0	--
July	87	66	95	58	4.2	2.0	6.4	0	
August	85	65	93	57	4.4	1.9	9.7	0	
September	79	58	89	46	3.4	0.8	7.4	0	--
October	69	47	83	33	2.6	0.9	7.0	0	--
November	57	37	73	24	2.6	0.9	5.0	(1)	1
December	47	30	64	14	3.1	1.0	4.8	3	3
Year	67	46	[2] 97	[3] 7	40.3	33.6	51.7	16	4

[1] Less than 0.5 day.
[2] Average annual maximum.
[3] Average annual minimum.

TABLE 10.—*Probabilities of last freezing temperatures in spring and first in fall*

[All data from Lynchburg, Va., elevation 648 feet]

Probability	Dates for given probability and temperature—				
	16° F or lower	20° F or lower	24° F or lower	28° F or lower	32° F or lower
Spring:					
1 year in 10 later than	March 9	March 23	March 29	April 10	April 21
2 years in 10 later than	February 28	March 15	March 22	April 3	April 16
5 years in 10 later than	February 12	February 27	March 9	March 21	April 6
Fall:					
1 year in 10 earlier than	November 30	November 20	November 11	October 24	October 13
2 years in 10 earlier than	December 5	November 25	November 17	October 30	October 18
5 years in 10 earlier than	December 19	December 5	November 27	November 10	October 27

between sunrise and sunset. In fall nearly half the days are clear, and in summer nearly half are partly cloudy. During the rest of the year, the days are fairly evenly divided between clear, partly cloudy, and cloudy.

The annual average percent of possible sunshine is 60 percent. The monthly average varies from 48 percent in January to 68 percent in July. It is higher in July because scattered cumulus cloud cover in summer interferes less with sunshine. The longer day length in summer combined with less cloud interference results in more abundant sunlight during the growing season.

Physiography, Relief, and Drainage

Campbell County and the City of Lynchburg lie wholly within the Piedmont physiographic province, just to the east of the Blue Ridge province. The geologic history of the survey area is quite old.

The survey area is well dissected by streams. The interstream divides are fairly wide and are sloping or rolling, except in the lower areas along the larger streams, where in many places they are steeper. Several low mountains are in the north and west, generally ranging from 200 to 600 feet above the surrounding terrain. Elevation ranges from about 350 feet above sea level at the junction of Falling River and the Roanoke River to about 1,440 feet at the top of Long Mountain. Generally, elevation averages 800 to 900 feet in the western part of the survey area and about 600 feet in the eastern part.

The survey area is a region of complex igneous or metamorphic rocks and rock formations, such as granite, greenstone, gneiss, quartzite, marble, and schist,

and zones of sedimentary sandstone, shale, and conglomerate (*4, 5*). Most rock formations are Precambrian or Paleozoic, but the sandstone, shale, and conglomerate are Triassic.

Marble is quarried and crushed for road metal and aggregate. Manganese and some iron ore and barite were mined extensively in the past. Greenstone has been quarried for building stone, and quartzite is presently quarried for this purpose.

The northern part, which makes up about 20 percent of the survey area, is in the James River watershed and is drained by its tributaries Blackwater Creek, Opossum Creek, Beaver Creek, and Archer Creek. These streams generally flow to the north and northeast. The central and southern parts, which make up 80 percent of the survey area, are in the Roanoke River watershed and are drained by its tributaries Big Otter River, Falling River, Seneca Creek, and Whipping Creek. These tributaries generally flow to the south and southeast.

Farming

Campbell County is chiefly a farming county; about 55 percent of the acreage is farmed (*12*). The number of farms, the farm population, and the acreage in farms, however, are steadily declining. The average size of farms is increasing, as is the value of farms and farm buildings. Some of the acreage farmed in the past is now commercial timberland, and some is used for highways, schools, urban development, and other purposes.

The number of livestock has almost doubled in the last 40 years. Most of the increase has been in beef cattle. Dairy cows, hogs, and sheep show a slight decline. The acreage of corn, wheat, and tobacco has declined, but yields per acre have increased. The acreage used for hay has doubled in the last 40 years. Most of the hay and much of the grain are fed to livestock on the farms where they are grown.

Transportation and Markets

Campbell County and the city of Lynchburg are served by the Norfolk and Western, the Chesapeake and Ohio, and the Southern Railroads. Lines are along the James River in the north, the Roanoke River in the south, and along U.S. Highway 501 through the center of the survey area.

Several Federal and State highways provide easy access to the survey area from both north and south and east and west. A network of all-weather, paved secondary State roads provides access to most parts of the survey area. Preston Glenn Airport, a few miles south of Lynchburg by U.S. Highway 29, serves one major airline.

A livestock market in the city of Lynchburg serves the survey area. There are three warehouses in Brookneal for marketing bright tobacco and one for dark tobacco in the city of Lynchburg. The Maryland-Virginia Milk Cooperative and local commercial dairies are markets for dairy products. Numerous dealers throughout the survey area handle farm machinery, fertilizers, and other farm supplies.

Water Supply

Water for farm and domestic use is obtained mainly from wells dug or drilled into the weathered rock zone. Generally, an adequate amount of water of fair to good quality can be obtained from wells less than 200 feet deep.

The largest potential freshwater supplies are the James River and the Roanoke River and their tributaries. The flow of most streams, however, is low during periods of drought, and storage facilities are necessary to secure dependable supplies. Part of Leesville Lake, behind Leesville Dam on the Roanoke River, borders the southwestern corner of the survey area. Reusens Dam is along the James River in the city of Lynchburg. Other large lakes include Timberlake, College Lake, Brookneal Reservoir, and a watershed lake on the Little Falling River. Many scattered farm ponds are throughout the survey area and are a source of water for livestock.

Literature Cited

(1) Allan, P. F., L. E. Garland, and R. F. Dugan. 1963. Rating northeastern soils for their suitability for wildlife habitat. 28th North Am. Wildl. Nat. Resour. Conf. Wildl. Manage. Inst., pp. 247–261, illus.

(2) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(3) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487–69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(4) Brown, William Randall. 1958. Geology and mineral resources of the Lynchburg quadrangle. Va. Dep. of Conserv. and Dev., Div. of Miner. Resour. Bull. 74, 74 pp., illus.

(5) Commonwealth of Virginia. 1963. Geologic map of Virginia. Dep. of Conserv. and Dev., Div. of Miner. Resour., 1 p.

(6) Portland Cement Association. 1962. PCA soil primer. 52 pp., illus.

(7) Simonson, Roy W. 1962. Soil classification in the United States. Sci. 137: 1027–1034.

(8) Thorp, James, and Guy D. Smith. 1949. Higher categories of soil classification: order, suborder, and great soil groups. Soil Sci. 67: 117–126.

(9) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503, pp., illus.

(10) ————. 1960. Soil classification, a comprehensive system, 7th approximation. Soil Conserv., 265 pp., illus. [Suppl. issued March 1967, Sept. 1968, and April 1969]

(11) United States Department of Health, Education, and Welfare. 1957. Manual of septic tank practices. Public Health Serv. Publ. 526. 93 pp., illus.

(12) Virginia Cooperative Crop Reporting Service. 1966. Campbell County farm statistics, 1910–1966. 4 pp., illus.

Glossary

Acidity. See Reaction, soil.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or

prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Coarse-textured soil. Sand, loamy sand, sandy loam, and fine sandy loam.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Erodible. Susceptible to erosion.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Fine-textured soil. *Moderately fine textured:* Clay loam, sandy clay loam, silty clay loam; *Fine-textured:* sandy clay, silty clay, and clay. Roughly, soil that is 35 percent or more clay.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Geological erosion. Normal erosion that takes place when the soil is under native vegetation and undisturbed by human activity.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, and covered by grass for protection against erosion.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Internal soil drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers, and by height of the water table, either permanent or perched. Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Leaching soil. Removal of material in solution by the passage of water through soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state. In engineering, a high liquid limit indicates that the soil has a high content of clay and a low capacity for supporting loads.

Mapping unit. Areas of soil of the same kind outlined on the soil map and identified by a symbol.

Medium-textured soil. Very fine sandy loam, loam, silt loam, and silt.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical mineral, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid

reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Runoff (hydraulics). The part of the precipitation upon a drainage area that is discharged from the area in stream channels. The water that flows off the surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along the rivers.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group
			Symbol	Page	Symbol
AbB	Abell fine sandy loam, 0 to 4 percent slopes	8	IIw-2	56	2o1
AeB	Abell loam, 0 to 4 percent slopes	8	IIw-2	56	2o1
AgB	Appling gravelly sandy loam, 2 to 6 percent slopes	9	IIe-5	55	3o1
AgC	Appling gravelly sandy loam, 6 to 15 percent slopes	9	IIIe-6	57	3o1
ApB	Appling fine sandy loam, 2 to 6 percent slopes	10	IIe-5	55	3o1
ApC2	Appling fine sandy loam, 6 to 15 percent slopes, eroded	10	IIIe-6	57	3o1
AwE2	Appling-Wedowee gravelly sandy loams, 15 to 25 percent slopes, eroded	10	IVe-1	58	3r1
AxE2	Appling-Wedowee fine sandy loams, 15 to 25 percent slopes, eroded	10	IVe-1	58	3r1
BrD	Bremo loam, 6 to 15 percent slopes	11	IVe-2	58	3d1
BrE	Bremo loam, 15 to 25 percent slopes	12	VIe-2	60	3d2
BrF	Bremo loam, 25 to 60 percent slopes	12	VIIe-1	60	3d2
Bu	Buncombe loamy fine sand	13	IIIs-1	58	2s1
CcB2	Cecil fine sandy loam, 2 to 6 percent slopes, eroded	14	IIe-1	54	3o1
CcC2	Cecil fine sandy loam, 6 to 15 percent slopes, eroded	14	IIIe-1	56	3o1
CcE2	Cecil fine sandy loam, 15 to 25 percent slopes, eroded	14	IVe-1	58	3r1
CdC	Cecil cobbly fine sandy loam, 6 to 15 percent slopes	14	IVe-5	59	3o1
CeB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	14	IIIe-3	57	4c1
CeD3	Cecil clay loam, 6 to 15 percent slopes, severely eroded	14	IVe-3	58	4c1
CeE3	Cecil clay loam, 15 to 25 percent slopes, severely eroded	15	VIe-1	59	4c2
Ch	Chewacla loam	15	IIIw-1	57	1w1
CT	Chewacla-Toccoa complex	15	IIIw-1	57	1w1
CuB	Cullen loam, 2 to 6 percent slopes	16	IIe-1	54	3o1
CuC2	Cullen loam, 6 to 15 percent slopes, eroded	16	IIIe-1	56	3o1
CuE2	Cullen loam, 15 to 25 percent slopes, eroded	16	IVe-1	58	3r1
CxB3	Cullen clay loam, 2 to 6 percent slopes, severely eroded	16	IIIe-3	57	4c1
CxC3	Cullen clay loam, 6 to 15 percent slopes, severely eroded	17	IVe-3	58	4c1
CxE3	Cullen clay loam, 15 to 25 percent slopes, severely eroded	17	VIe-1	59	4c2
DoA	Dogue fine sandy loam, 0 to 2 percent slopes	18	IIw-2	56	2w2
DoB	Dogue fine sandy loam, 2 to 6 percent slopes	18	IIe-2	55	2w2
Eb	Elbert loam	19	Vw-1	59	4w1
EnB	Enon fine sandy loam, 2 to 6 percent slopes	19	IIe-2	55	4o2
EnC2	Enon fine sandy loam, 6 to 10 percent slopes, eroded	19	IIIe-4	57	4o2
FlB2	Fluvanna fine sandy loam, 2 to 6 percent slopes, eroded	20	IIe-1	54	3o1
FlC2	Fluvanna fine sandy loam, 6 to 15 percent slopes, eroded	20	IIIe-1	56	3o1
FlE2	Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded	20	IVe-1	58	3r1
Fo	Forestdale silt loam	21	Vw-1	59	1w2
GeB2	Georgeville loam, 2 to 6 percent slopes, eroded	22	IIe-1	54	3o1
GeC2	Georgeville loam, 6 to 15 percent slopes, eroded	22	IIIe-1	56	3o1
GeE2	Georgeville loam, 15 to 25 percent slopes, eroded	22	IVe-1	58	3r1
GrB	Georgeville-Brockroad loams, 2 to 6 percent slopes	22	IIe-1	54	3o1
GwB	Gwinnett clay loam, thick solum variant, 2 to 6 percent slopes	23	IIIe-3	57	3o1
GwC	Gwinnett clay loam, thick solum variant, 6 to 15 percent slopes	23	IVe-3	58	3o1
HaB	Helena fine sandy loam, 2 to 6 percent slopes	24	IIIe-4	57	3w1
HaC	Helena fine sandy loam, 6 to 15 percent slopes	24	IIIe-4	57	3w1
HdB	Herndon loam, 2 to 6 percent slopes	25	IIe-5	55	3o1
HdC	Herndon loam, 6 to 10 percent slopes	25	IIIe-6	57	3o1
HwB2	Hiwassee loam, 2 to 6 percent slopes, eroded	25	IIe-1	54	3o1
HwC2	Hiwassee loam, 6 to 15 percent slopes, eroded	26	IIIe-1	56	3o1
HwE2	Hiwassee loam, 15 to 25 percent slopes, eroded	26	IVe-1	58	3r1
IrB	Iredell loam, 2 to 6 percent slopes	27	IIIe-4	57	4w2
IrB2	Iredell loam, 2 to 6 percent slopes, eroded	27	IVe-4	59	4w2

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group
			Symbol	Page	Symbol
IrC	Iredell loam, 6 to 10 percent slopes	27	IVe-4	59	4w2
IrC2	Iredell loam, 6 to 10 percent slopes, eroded	28	IVe-4	59	4w2
LoD	Louisburg fine sandy loam, 6 to 15 percent slopes	28	IVe-2	58	3o2
LoE	Louisburg fine sandy loam, 15 to 25 percent slopes	28	VIe-2	60	3r2
LoF	Louisburg fine sandy loam, 25 to 60 percent slopes	28	VIIe-1	60	3r2
MaB2	Madison loam, 2 to 6 percent slopes, eroded	29	IIe-1	54	3o1
MaC2	Madison loam, 6 to 15 percent slopes, eroded	29	IIIe-1	56	3o1
MaE2	Madison loam, 15 to 25 percent slopes, eroded	29	IVe-1	58	3r1
McD	Manteo channery loam, 6 to 15 percent slopes	30	VIe-2	60	4d1
McE	Manteo channery loam, 15 to 25 percent slopes	30	VIIe-1	60	4d2
McF	Manteo channery loam, 25 to 60 percent slopes	30	VIIe-1	60	4d2
MNE	Manteo-Rock outcrop complex, steep	30	VIIe-1	60	5d1
MpB	Masada fine sandy loam, 2 to 6 percent slopes	32	IIe-5	55	3o1
MpC	Masada fine sandy loam, 6 to 15 percent slopes	32	IIIe-6	57	3o1
MrB	Masada gravelly fine sandy loam, 2 to 6 percent slopes	32	IIe-5	55	3o1
MrC	Masada gravelly fine sandy loam, 6 to 10 percent slopes	32	IIIe-6	57	3o1
MsB2	Masada loam, 2 to 6 percent slopes, eroded	32	IIe-5	55	3o1
MsC2	Masada loam, 6 to 12 percent slopes, eroded	32	IIIe-6	57	3o1
MtB	Masada loam, local alluvium, 0 to 4 percent slopes	32	IIw-1	55	2o1
MwB	Mayodan fine sandy loam, 2 to 6 percent slopes	33	IIe-5	55	3o1
MwC	Mayodan fine sandy loam, 6 to 15 percent slopes	33	IIIe-6	57	3o1
MyB2	Mayodan loam, 2 to 6 percent slopes, eroded	33	IIe-5	55	3o1
MyC2	Mayodan loam, 6 to 15 percent slopes, eroded	33	IIIe-6	57	3o1
MzB2	Mecklenburg loam, 2 to 6 percent slopes, eroded	34	IIe-2	55	4o2
MzC2	Mecklenburg loam, 6 to 15 percent slopes, eroded	34	IIIe-4	57	4o2
MzE2	Mecklenburg loam, 15 to 25 percent slopes, eroded	34	IVe-1	58	4r2
NaB	Nason loam, 2 to 6 percent slopes	35	IIe-4	55	3o1
NaC	Nason loam, 6 to 15 percent slopes	35	IIIe-2	56	3o1
NaE	Nason loam, 15 to 25 percent slopes	35	IVe-1	58	3r1
PeA	Penn silt loam, 0 to 2 percent slopes	36	IIs-1	56	3o2
PeB	Penn silt loam, 2 to 6 percent slopes	36	IIe-4	55	3o2
PeC	Penn silt loam, 6 to 15 percent slopes	36	IIIe-2	56	3o2
PkB	Pinkston fine sandy loam, 2 to 6 percent slopes	37	IIIe-2	56	4d1
PkD	Pinkston fine sandy loam, 6 to 15 percent slopes	37	IVe-2	58	4d1
PpE	Pinkston and Penn soils, 15 to 25 percent slopes	37	VIe-2	60	4r1
Re	Riverview loam	38	IIw-1	55	1o1
Ro	Roanoke silt loam, local alluvium	39	Vw-1	59	1w2
StA	State fine sandy loam, 0 to 2 percent slopes	40	IIw-1	55	1o1
StB	State fine sandy loam, 2 to 6 percent slopes	40	IIe-1	54	1o1
TaD	Tallapoosa loam, 6 to 15 percent slopes	41	IVe-2	58	4o1
TaE	Tallapoosa loam, 15 to 25 percent slopes	41	VIe-2	60	4r1
TaF	Tallapoosa loam, 25 to 60 percent slopes	41	VIIe-1	60	4r1
TlB	Tatum loam, 2 to 6 percent slopes	42	IIe-2	55	3o1
TlC2	Tatum loam, 6 to 15 percent slopes, eroded	42	IIIe-2	56	3o1
TlE2	Tatum loam, 15 to 25 percent slopes, eroded	43	IVe-1	58	3r1
TmD3	Tatum clay loam, 6 to 15 percent slopes, severely eroded	43	IVe-3	58	4c1
TmE3	Tatum clay loam, 15 to 25 percent slopes, severely eroded	43	VIe-1	59	4c2
To	Toccoa fine sandy loam	43	IIw-1	55	1o1
TuB	Turbeville fine sandy loam, 2 to 6 percent slopes	44	IIe-1	54	3o1
TuC2	Turbeville fine sandy loam, 6 to 15 percent slopes, eroded	44	IIIe-1	56	3o1
UL	Urban land	44	------	--	---

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group
			Symbol	Page	Symbol
UNC	Urban land-Cecil complex, sloping	45	------	--	---
URC	Urban land-Cullen complex, sloping	45	------	--	---
USC	Urban land-Madison complex, sloping	45	------	--	---
VaB	Vance fine sandy loam, 2 to 6 percent slopes	45	IIe-2	55	3o1
VaB2	Vance fine sandy loam, 2 to 6 percent slopes, eroded	46	IIe-2	55	3o1
VaC2	Vance fine sandy loam, 6 to 10 percent slopes, eroded	46	IIIe-4	57	3o1
Wa	Wahee and Augusta loams	46	IIIw-2	58	2w1
Wd	Wehadkee loam	48	IVw-1	59	1w2
WeA	White Store fine sandy loam, 0 to 2 percent slopes	49	IIIw-2	58	4c3
WeB	White Store fine sandy loam, 2 to 6 percent slopes	49	IIIe-4	57	4c3
WgA	White Store loam, 0 to 2 percent slopes	49	IIIw-2	58	4c3
WgB	White Store loam, 2 to 6 percent slopes	49	IIIe-4	57	4c3
WhA	White Store loam, wet variant, 0 to 2 percent slopes	50	IIIw-2	58	2w1
WhB	White Store loam, wet variant, 2 to 6 percent slopes	50	IIIe-4	57	2w1
WkB	Wilkes loam, 2 to 6 percent slopes	51	IIIe-2	56	4o1
WkD	Wilkes loam, 6 to 15 percent slopes	51	IVe-2	58	4o1
WkE	Wilkes loam, 15 to 25 percent slopes	51	VIe-2	60	4r2
WkF	Wilkes loam, 25 to 60 percent slopes	51	VIIe-1	60	4r2
WlE3	Wilkes soils, 15 to 25 percent slopes, severely eroded	51	VIIe-1	60	4r2
WoB	Worsham soils, 0 to 4 percent slopes	52	Vw-1	59	2w3

☆ U. S. GOVERNMENT PRINTING OFFICE : 1977--227-034/34

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

Nondiscrimination Statement

Nondiscrimination Policy

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the basis of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, whether all or part of an individual's income is derived from any public assistance program, or protected genetic information. The Department prohibits discrimination in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases apply to all programs and/or employment activities.)

To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (http://directives.sc.egov.usda.gov/33081.wba) within 45 days of the date of the alleged discriminatory act, event, or personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by mail to U.S. Department of Agriculture; Director, Office of Adjudication; 1400 Independence Avenue, S.W.; Washington, D.C. 20250-9419; by fax to (202) 690-7442; or by email to program.intake@usda.gov.

Persons with Disabilities

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for

program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Supplemental Nutrition Assistance Program

For additional information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, call either the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish, or the State Information/Hotline Numbers (http://directives.sc.egov.usda.gov/33085.wba).

All Other Inquiries

For information not pertaining to civil rights, please refer to the listing of the USDA Agencies and Offices (http://directives.sc.egov.usda.gov/33086.wba).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

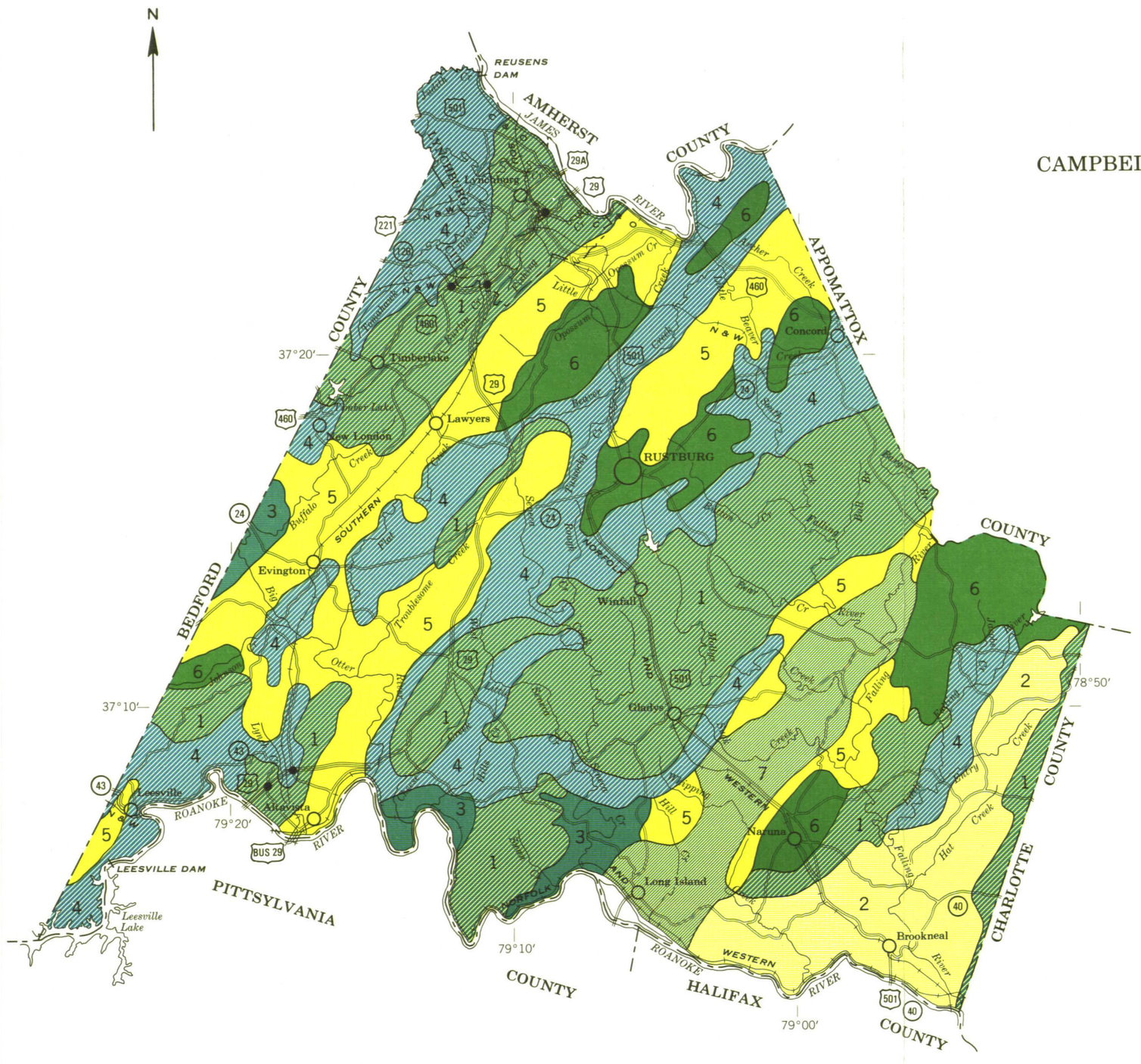
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

GENERAL SOIL MAP

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA

Scale 1:253,440

1 0 1 2 3 4 Miles



SOIL ASSOCIATIONS

1. Cecil-Appling association: Deep, well-drained, gently sloping to moderately steep soils that have a dominantly firm clayey subsoil; on uplands
2. Appling-Louisburg association: Deep and moderately deep, well drained to excessively drained, gently sloping to steep soils that have a dominantly clayey or loamy subsoil; on uplands
3. Madison-Tallapoosa association: Deep and moderately deep, well-drained, gently sloping to steep soils that have a dominantly clayey or loamy subsoil; on uplands
4. Cullen-Wilkes association: Deep and moderately deep, well-drained, gently sloping to steep soils that have a dominantly clayey subsoil; on uplands
5. Tatum-Manteo-Nason association: Deep and shallow, well drained and somewhat excessively drained, gently sloping to steep soils that have a dominantly clayey or loamy subsoil; on uplands
6. Georgeville-Tatum association: Deep, well-drained, gently sloping to moderately steep soils that have a friable, dominantly clayey subsoil; on uplands
7. Mayodan-Penn-White Store association: Deep and moderately deep, well drained to somewhat poorly drained, nearly level to moderately steep soils that have a dominantly clayey or loamy subsoil; on uplands

Compiled 1974

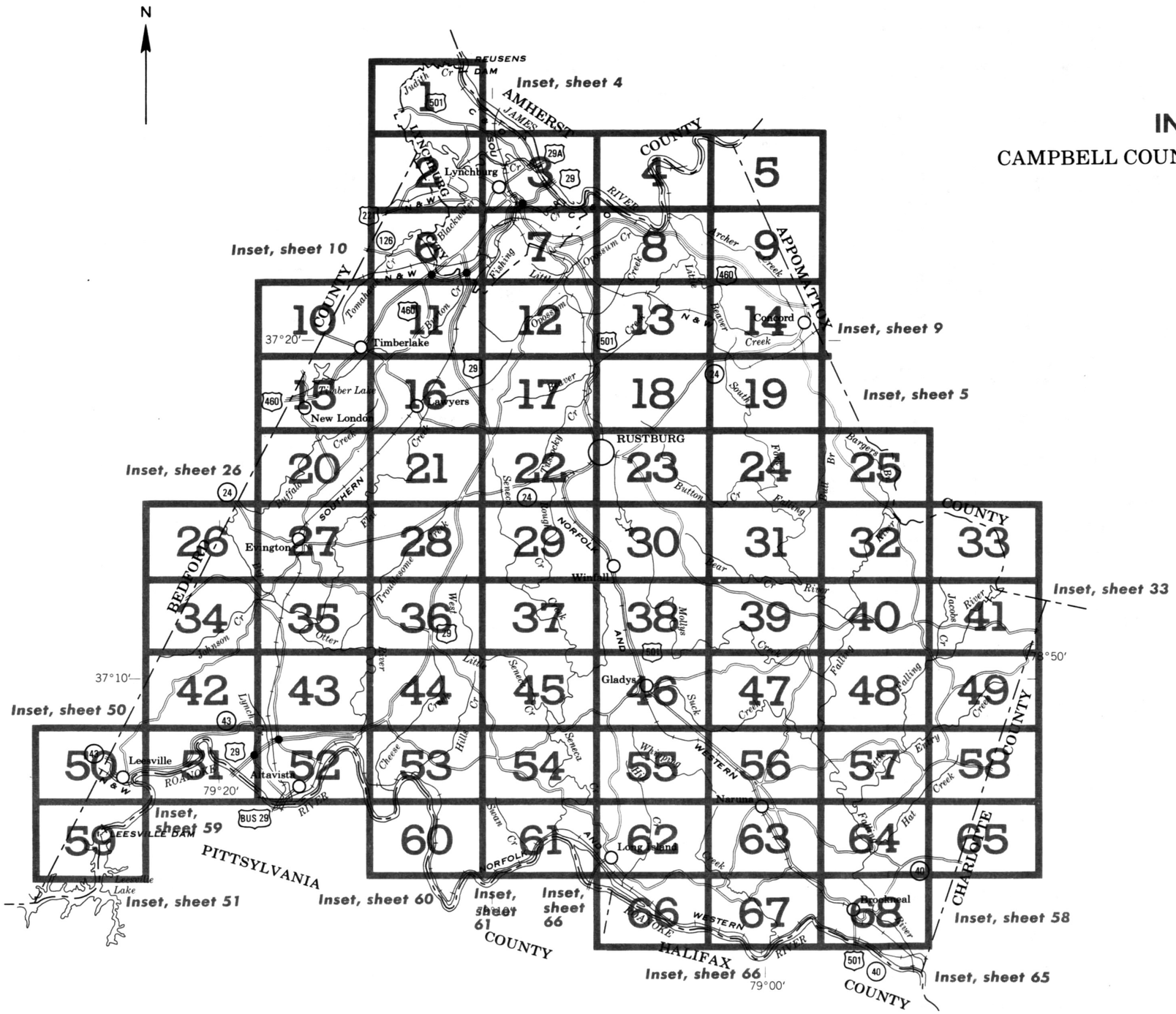
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

INDEX TO MAP SHEETS

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA

Scale 1:253,440

1 0 1 2 3 4 Miles



SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined; otherwise, it is a small letter. The third letter, always a capital, A, B, C, D, E, or F, shows the slope. Most symbols without a slope letter are those of nearly level soils, but some are for broadly defined units that have a fair to considerable range of slope. A final number, 2 or 3, in the symbol shows that the soil is eroded or severely eroded.

SYMBOL	NAME
AbB	Abell fine sandy loam, 0 to 4 percent slopes
AeB	Abell loam, 0 to 4 percent slopes
AgB	Appling gravelly sandy loam, 2 to 6 percent slopes
AgC	Appling gravelly sandy loam, 6 to 15 percent slopes
ApB	Appling fine sandy loam, 2 to 6 percent slopes
ApC2	Appling fine sandy loam, 6 to 15 percent slopes, eroded
AwE2	Appling-Wedowee gravelly sandy loams, 15 to 25 percent slopes, eroded
AxE2	Appling-Wedowee fine sandy loams, 15 to 25 percent slopes, eroded
BrD	Bremo loam, 6 to 15 percent slopes
BrE	Bremo loam, 15 to 25 percent slopes
BrF	Bremo loam, 25 to 60 percent slopes
Bu	Buncombe loamy fine sand
CcB2	Cecil fine sandy loam, 2 to 6 percent slopes, eroded
CcC2	Cecil fine sandy loam, 6 to 15 percent slopes, eroded
CcE2	Cecil fine sandy loam, 15 to 25 percent slopes, eroded
CdC	Cecil cobbly fine sandy loam, 6 to 15 percent slopes
CeB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded
CeD3	Cecil clay loam, 6 to 15 percent slopes, severely eroded
CeE3	Cecil clay loam, 15 to 25 percent slopes, severely eroded
Ch	Chewacla loam
CT	Chewacla-Toccoa complex *
CuB	Cullen loam, 2 to 6 percent slopes
CuC2	Cullen loam, 6 to 15 percent slopes, eroded
CuE2	Cullen loam, 15 to 25 percent slopes, eroded
CxB3	Cullen clay loam, 2 to 6 percent slopes, severely eroded
CxC3	Cullen clay loam, 6 to 15 percent slopes, severely eroded
CxE3	Cullen clay loam, 15 to 25 percent slopes, severely eroded
DoA	Dogue fine sandy loam, 0 to 2 percent slopes
DoB	Dogue fine sandy loam, 2 to 6 percent slopes
Eb	Elbert loam
EnB	Enon fine sandy loam, 2 to 6 percent slopes
EnC2	Enon fine sandy loam, 6 to 10 percent slopes, eroded
FlB2	Fluvanna fine sandy loam, 2 to 6 percent slopes, eroded
FlC2	Fluvanna fine sandy loam, 6 to 15 percent slopes, eroded
FlE2	Fluvanna fine sandy loam, 15 to 25 percent slopes, eroded
Fo	Forestdale silt loam
GeB2	Georgeville loam, 2 to 6 percent slopes, eroded
GeC2	Georgeville loam, 6 to 15 percent slopes, eroded
GeE2	Georgeville loam, 15 to 25 percent slopes, eroded
GrB	Georgeville-Brockroad loams, 2 to 6 percent slopes
GwB	Gwinnett clay loam, thick solum variant, 2 to 6 percent slopes
GwC	Gwinnett clay loam, thick solum variant, 6 to 15 percent slopes
HaB	Helena fine sandy loam, 2 to 6 percent slopes
HaC	Helena fine sandy loam, 6 to 15 percent slopes
HdB	Herndon loam, 2 to 6 percent slopes
HdC	Herndon loam, 6 to 10 percent slopes
HwB2	Hiwassee loam, 2 to 6 percent slopes, eroded
HwC2	Hiwassee loam, 6 to 15 percent slopes, eroded
HwE2	Hiwassee loam, 15 to 25 percent slopes, eroded
IrB	Iredell loam, 2 to 6 percent slopes
IrB2	Iredell loam, 2 to 6 percent slopes, eroded
IrC	Iredell loam, 6 to 10 percent slopes
IrC2	Iredell loam, 6 to 10 percent slopes, eroded
LoD	Louisburg fine sandy loam, 6 to 15 percent slopes
LoE	Louisburg fine sandy loam, 15 to 25 percent slopes
LoF	Louisburg fine sandy loam, 25 to 60 percent slopes
MaB2	Madison loam, 2 to 6 percent slopes, eroded
MaC2	Madison loam, 6 to 15 percent slopes, eroded
MaE2	Madison loam, 15 to 25 percent slopes, eroded
McD	Manteo channery loam, 6 to 15 percent slopes
McE	Manteo channery loam, 15 to 25 percent slopes
McF	Manteo channery loam, 25 to 60 percent slopes
MNE	Manteo-Rock outcrop complex, steep *
MpB	Masada fine sandy loam, 2 to 6 percent slopes
MpC	Masada fine sandy loam, 6 to 15 percent slopes
MrB	Masada gravelly fine sandy loam, 2 to 6 percent slopes
MrC	Masada gravelly fine sandy loam, 6 to 10 percent slopes
MsB2	Masada loam, 2 to 6 percent slopes, eroded
MsC2	Masada loam, 6 to 12 percent slopes, eroded
MtB	Masada loam, local alluvium, 0 to 4 percent slopes
MwB	Mayodan fine sandy loam, 2 to 6 percent slopes
MwC	Mayodan fine sandy loam, 6 to 15 percent slopes
MyB2	Mayodan loam, 2 to 6 percent slopes, eroded
MyC2	Mayodan loam, 6 to 15 percent slopes, eroded
MzB2	Mecklenburg loam, 2 to 6 percent slopes, eroded
MzC2	Mecklenburg loam, 6 to 15 percent slopes, eroded
MzE2	Mecklenburg loam, 15 to 25 percent slopes, eroded
NaB	Nason loam, 2 to 6 percent slopes
NaC	Nason loam, 6 to 15 percent slopes
NaE	Nason loam, 15 to 25 percent slopes
PeA	Penn silt loam, 0 to 2 percent slopes
PeB	Penn silt loam, 2 to 6 percent slopes
PeC	Penn silt loam, 6 to 15 percent slopes
PkB	Pinkston fine sandy loam, 2 to 6 percent slopes
PkD	Pinkston fine sandy loam, 6 to 15 percent slopes
PpE	Pinkston and Penn soils, 15 to 25 percent slopes
Re	Riverview loam
Ro	Roanoke silt loam, local alluvium
StA	State fine sandy loam, 0 to 2 percent slopes
StB	State fine sandy loam, 2 to 6 percent slopes
TaD	Tallapoosa loam, 6 to 15 percent slopes
TaE	Tallapoosa loam, 15 to 25 percent slopes
TaF	Tallapoosa loam, 25 to 60 percent slopes
TlB	Tatum loam, 2 to 6 percent slopes
TlC2	Tatum loam, 6 to 15 percent slopes, eroded
TlE2	Tatum loam, 15 to 25 percent slopes, eroded
TmD3	Tatum clay loam, 6 to 15 percent slopes, severely eroded
TmE3	Tatum clay loam, 15 to 25 percent slopes, severely eroded
To	Toccoa fine sandy loam
TuB	Turbeville fine sandy loam, 2 to 6 percent slopes
TuC2	Turbeville fine sandy loam, 6 to 15 percent slopes, eroded
UL	Urban land *
UNC	Urban land-Cecil complex, sloping *
URC	Urban land-Cullen complex, sloping *
USC	Urban land-Madison complex, sloping *
VaB	Vance fine sandy loam, 2 to 6 percent slopes,
VaB2	Vance fine sandy loam, 2 to 6 percent slopes eroded
VaC2	Vance fine sandy loam, 6 to 10 percent slopes, eroded
Wa	Wahee and Augusta loams
Wd	Wehadkee loam
WeA	White Store fine sandy loam, 0 to 2 percent slopes
WeB	White Store fine sandy loam, 2 to 6 percent slopes
WgA	White Store loam, 0 to 2 percent slopes
WgB	White Store loam, 2 to 6 percent slopes
WhA	White Store loam, wet variant, 0 to 2 percent slopes
WhB	White Store loam, wet variant, 2 to 6 percent slopes
WkB	Wilkes loam, 2 to 6 percent slopes
WkD	Wilkes loam, 6 to 15 percent slopes
WkE	Wilkes loam, 15 to 25 percent slopes
WkF	Wilkes loam, 25 to 60 percent slopes
WlE3	Wilkes soils, 15 to 25 percent slopes, severely eroded
WoB	Worsham soils, 0 to 4 percent slopes

* The composition of these units is more variable than that of the others in the survey area, but has been controlled well enough to be interpreted for the expected use of the soils.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 1

1 785 000 FEET

410 000 FEET

BEDFORD COUNTY

BEDFORD CO

AMHERST COUNTY

LYNCHBURG CITY

JAMES RIVER

Judith Creek

Burrell Creek

Pigeon Creek

Woodruff Island

Peakland

Reusens

REUSENS DAM

CHESAPEAKE AND OHIO

LYNCHBURG

UL

501

CT

1 800 000 FEET

(Joins sheet 2)

(Joins inset, sheet 4)

405 000 FEET

CcC2

1

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0 1/4 1 000 1/2 2 000 3/4 3 000 1 4 000 5 000

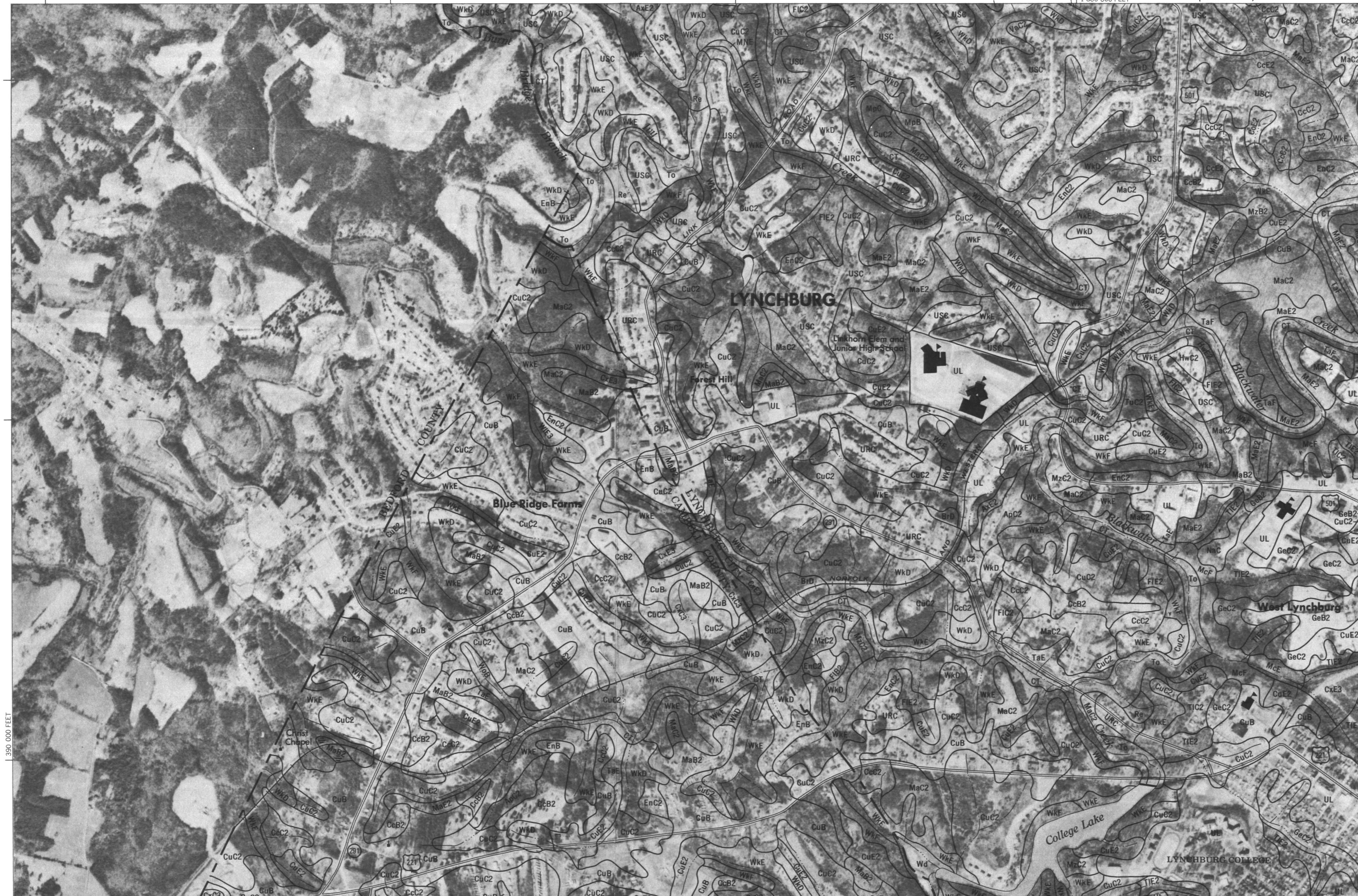
(2)

N

Scale 1:15 840

1 Mile — 5 000 Feet

(Joins sheet 1)



(Joins sheet 3)

(Joins sheet 6)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

0

1 000

¼

2 000

½

3 000

¾

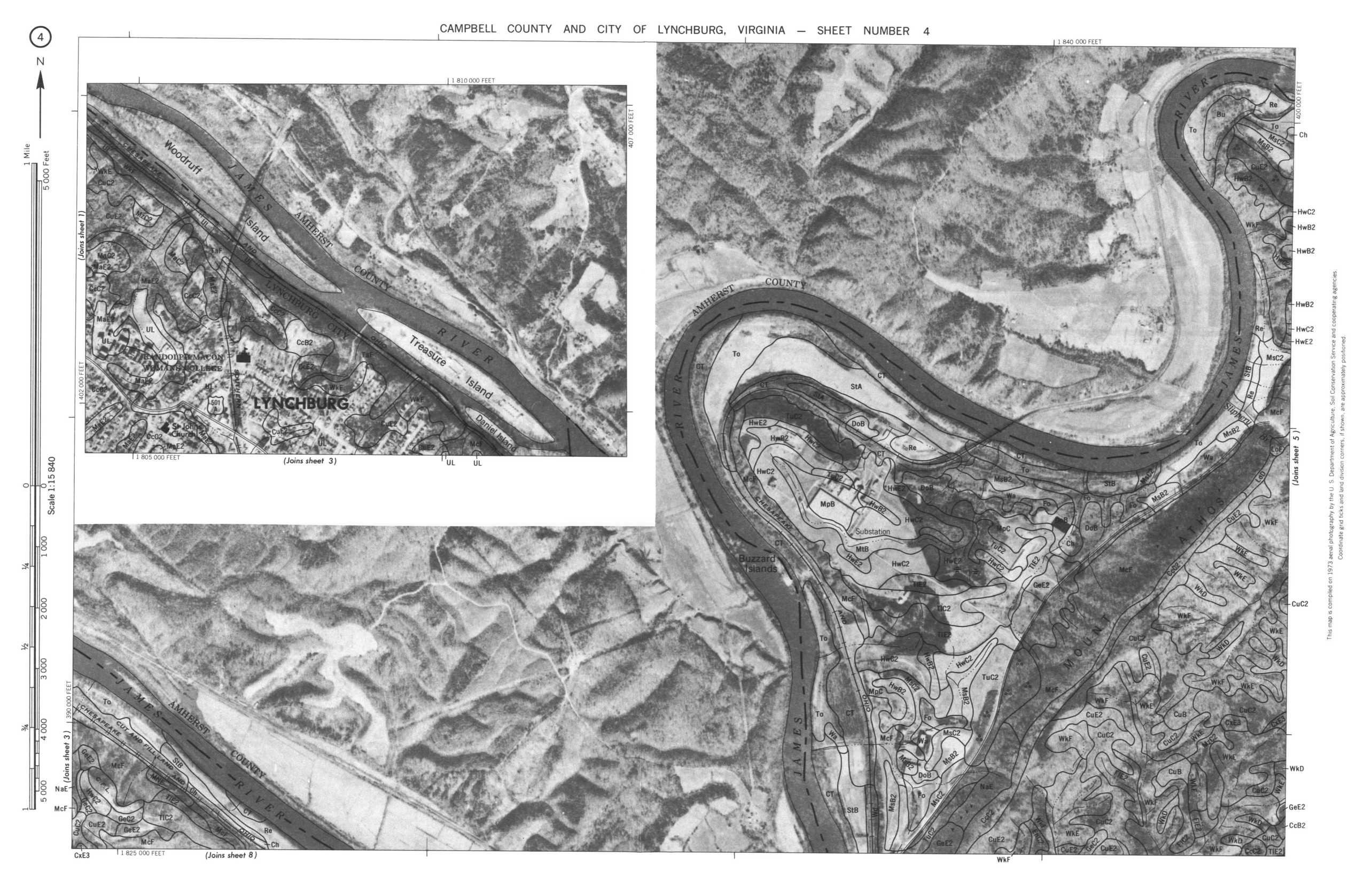
4 000

1

5 000

Scale 1:15 840

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

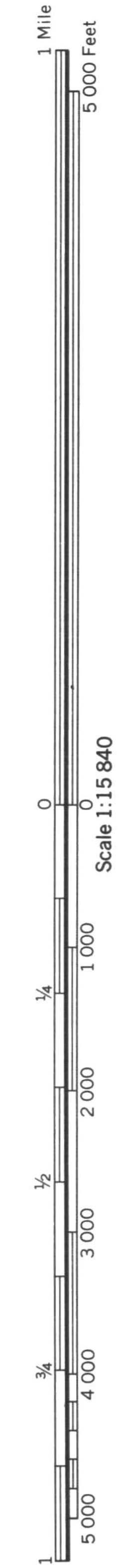


This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 845 000 FEET

(Joins inset, sheet 9) 1 865 000 FEET

N

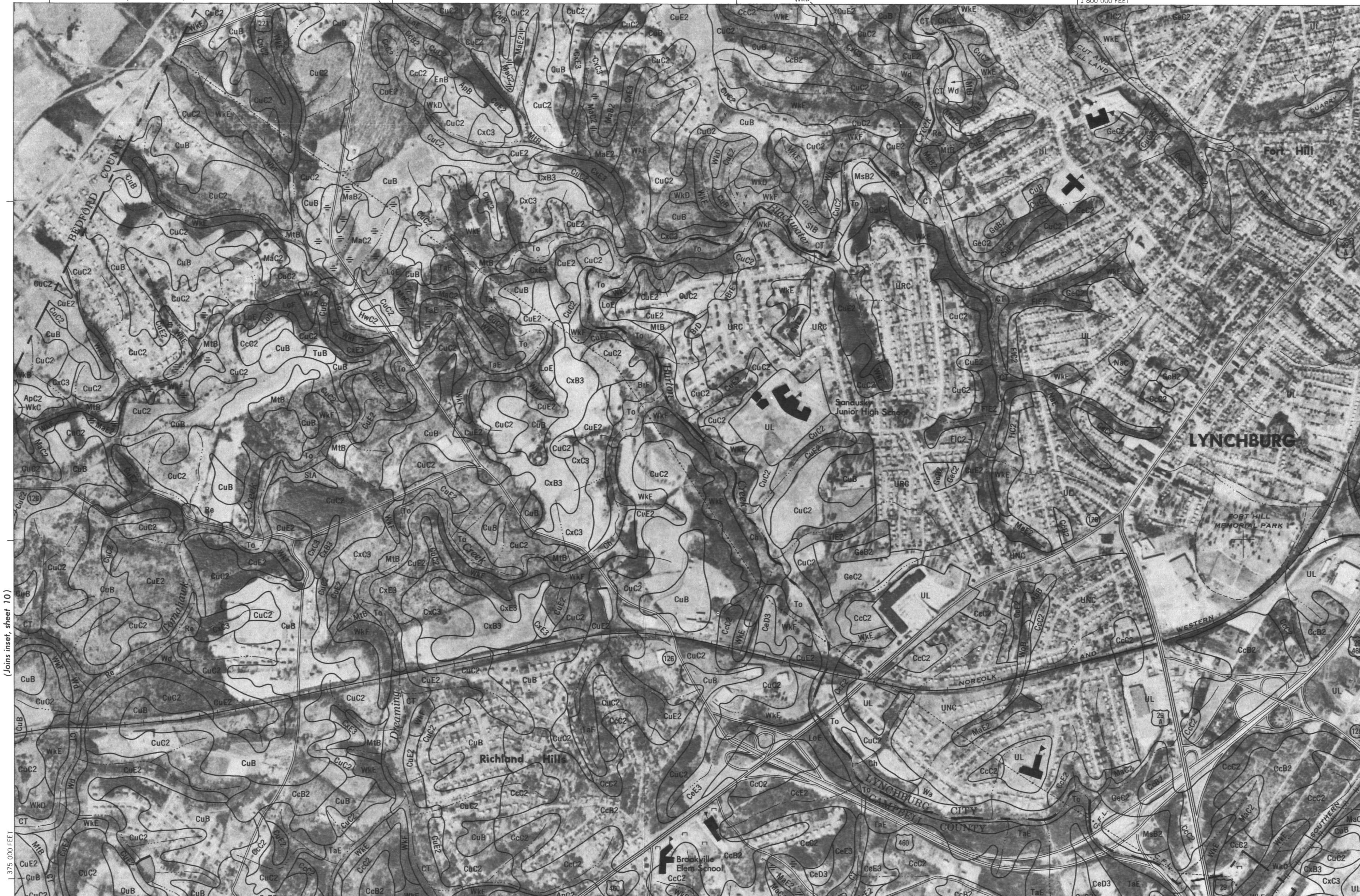


Scale 1:15 840

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 6

(Joins sheet 2)



(Joins inset, sheet 10)

(Joins sheet 7)

(Joins sheet 11)

N

Scale 1:15 840

1 Mile — ¾ — ½ — ¼ — 0

5 000 Feet — 4 000 — 3 000 — 2 000 — 1 000 — 0

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 7

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 4)

1 840 000 FEET

JAMES — AMHERST COUNTY — RIVER

CHESAPEAKE & O. R.R.

Six Mile Creek

Archer Creek

Beaver Creek

Little Beaver Creek

Oppossum Creek

Little Creek

Silver Spring Lake

Fleagans Island

CUT AND FILL LAND

QUARRY

(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 13)

1 825 000 FEET

385 000 FEET

375 000 FEET

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 845 000 FEET

(Joins sheet 5)

385 000 FEET

(Joins sheet 8)

(Joins sheet 14)

375 000 FEET

860 000 FEET

MzC2

1 865 000 FEET

365 000 FEET

(Joins sheet 14)

(Joins sheet 5)

1 868 000 FEET

362 000 FEET

3000-FOOT GRID TICKS

APPOMATTOX COUNTY

Archer Creek

Thomas Terrace

MT OLIVET CEMETERY

New Hope Church

StA

CT

9

N

1 Mile

5 000 Feet

Scale 1:15 840

0 0

¼ 1 000

½ 2 000

¾ 3 000

4 000

5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 11

12

N

Scale 1:15 840

1 Mile 5 000 Feet

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

CT (Joins sheet 7)

1 820 000 FEET

370 000 FEET

365 000 FEET

1 805 000 FEET (Joins sheet 17)

(Joins sheet 11)

(Joins sheet 13)

CANDLER MOUNTAIN

JAGGED MOUNTAIN

LYNCHBURG CITY
CAMPBELL COUNTY

Lone Jack Station

Opossum Creek

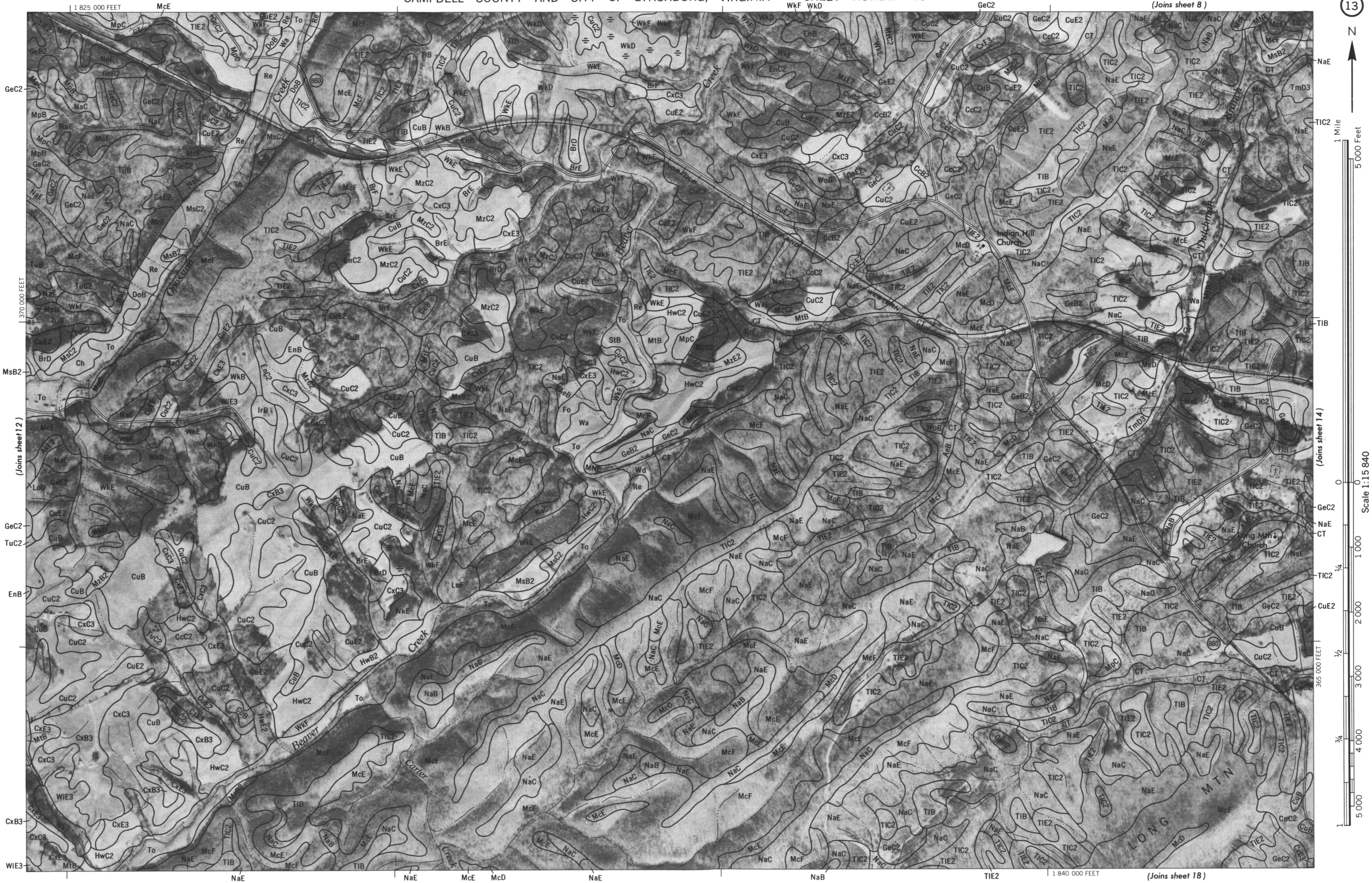
Pine Lake

CUT AND FILL LAND

QUARRY

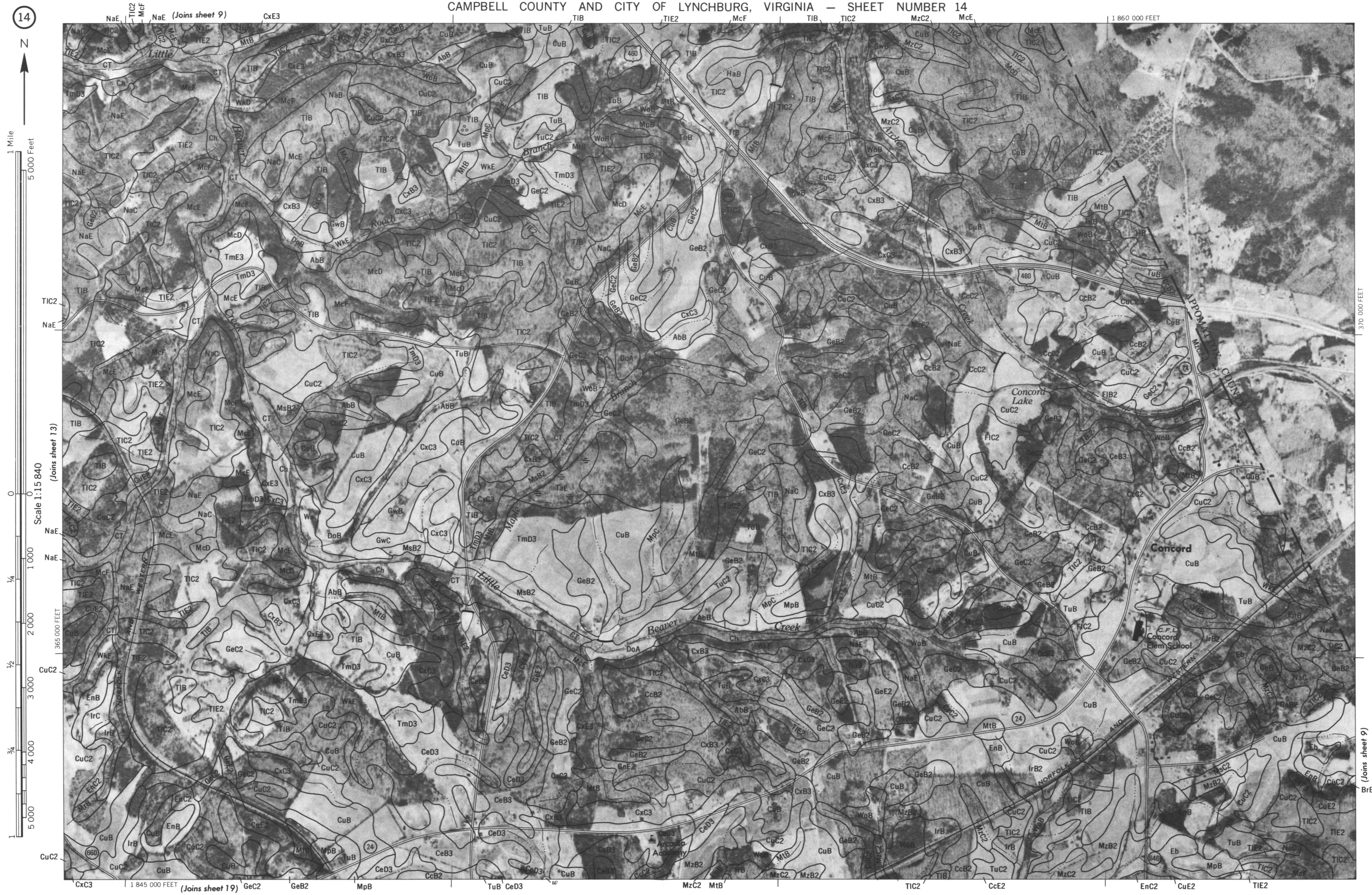
WESTERN

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 9)



(Joins sheet 13)

(Joins sheet 19)

(Joins sheet 9)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 16

N

(Joins sheet 11)

(Joins sheet 21)

Scale 1:15 840

1 Mile | 0 | ¼ | ½ | ¾ | 1

5 000 Feet | 0 | 1 000 | 2 000 | 3 000 | 4 000 | 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 17

17

N

1 805 000 FEET

360 000 FEET

(Joins sheet 12)

(Joins sheet 16)

(Joins sheet 18)

(Joins sheet 22)

1 820 000 FEET

350 000 FEET

1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile 5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

1 840 000 FEET

360 000 FEET

350 000 FEET

1 825 000 FEET

(Joins sheet 13) (Joins sheet 17) (Joins sheet 19) (Joins sheet 23)

MOUNTAIN LONG

Beaver Creek Carters Creek Poplar Springs Branch Morton Creek Mead Lake

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 20

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

21

N

1 Mile
5 000 Feet

Scale 1:15 840

1 0 1 000 2 000 3 000 4 000 5 000
¼ ½ ¾
0 0

22

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 22

N

Scale 1:15 840

1 Mile

5 000 Feet

0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000

340 000 FEET

345 000 FEET

1 820 000 FEET

1 805 000 FEET

(Joins sheet 17)

(Joins sheet 21)

(Joins sheet 23)

(Joins sheet 29)

Rockdale Lake

Yellow Branch Wesleyan Church

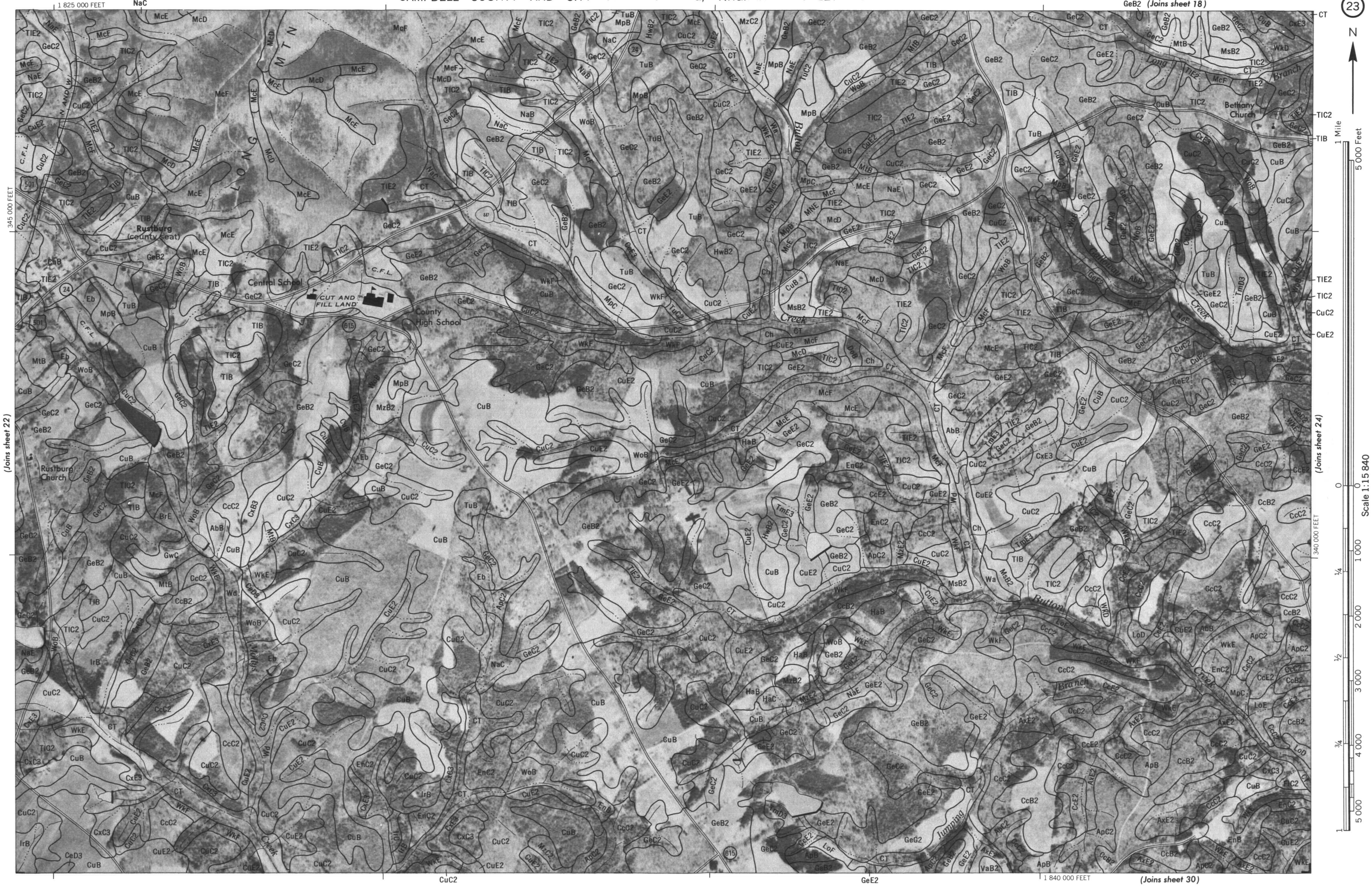
Seneca Creek

WESTERN

NORFOLK

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 23



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 24

24

N

1 Mile

5 000 Feet

Scale 1:15 840

1 inch = 1/4 mile

1 centimeter = 1/2 kilometer

1 860 000 FEET

345 000 FEET

340 000 FEET

1 845 000 FEET

(Joins sheet 19)

(Joins sheet 23)

(Joins sheet 25)

(Joins sheet 31)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.

Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins inset, sheet 5)

1 865 000 FEET

345000 FEET

(Joins sheet 24)

(Joins sheet 32)

1 880 000 FEET

Sherwill

APPOMATTOX COUNTY

Buffalo

Scale 1:15 840

1 Mile

5 000 Feet

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile 5 000 Feet

Scale 1:15 840

0 0 ¼ 1 000 ½ 2 000 ¾ 3 000 1 4 000 5 000

1 764 000 FEET

345 000 FEET

325 000 FEET

335 000 FEET

1 760 000 FEET

1 750 000 FEET

(Joins sheet 20)

(Joins upper right)

(Joins inset)

(Joins sheet 27)

(Joins sheet 34)

COUNTY

BEDFORD

Creek

Buffalo

Ortrix

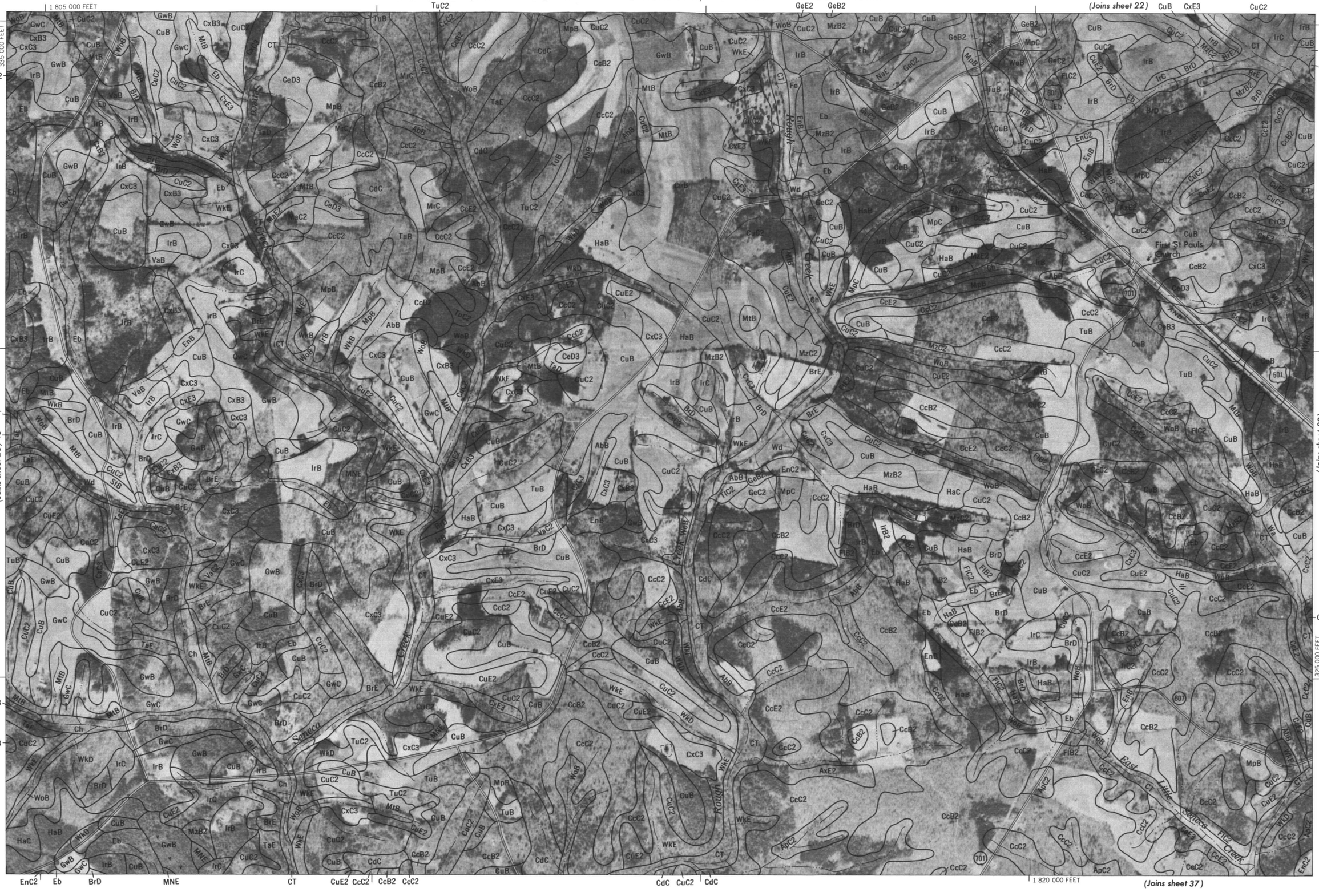
CREEK

RIVER

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 27

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


28
N
(Joins sheet 21)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 36)
1 800 000 FEET
335 000 FEET
325 000 FEET
1 785 000 FEET
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1
Salem Church
Troublesome Creek
Seminole
CUT AND FILL LAND
24
29
MzE2
WkD
CuC2
CuE2
CxE3
CuB
EnB
CeE3
CcC2
TlE2
WoB
MtB
WkE
McD
NaC
TuC2
This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 23)

1 840 000 FEET

335 000 FEET

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

325 000 FEET

Mollus Cr

Mollus Creek

Three Forks

Winfall

Calvary Church

Mt Zion

NORFOLK AND WESTERN RAILWAY

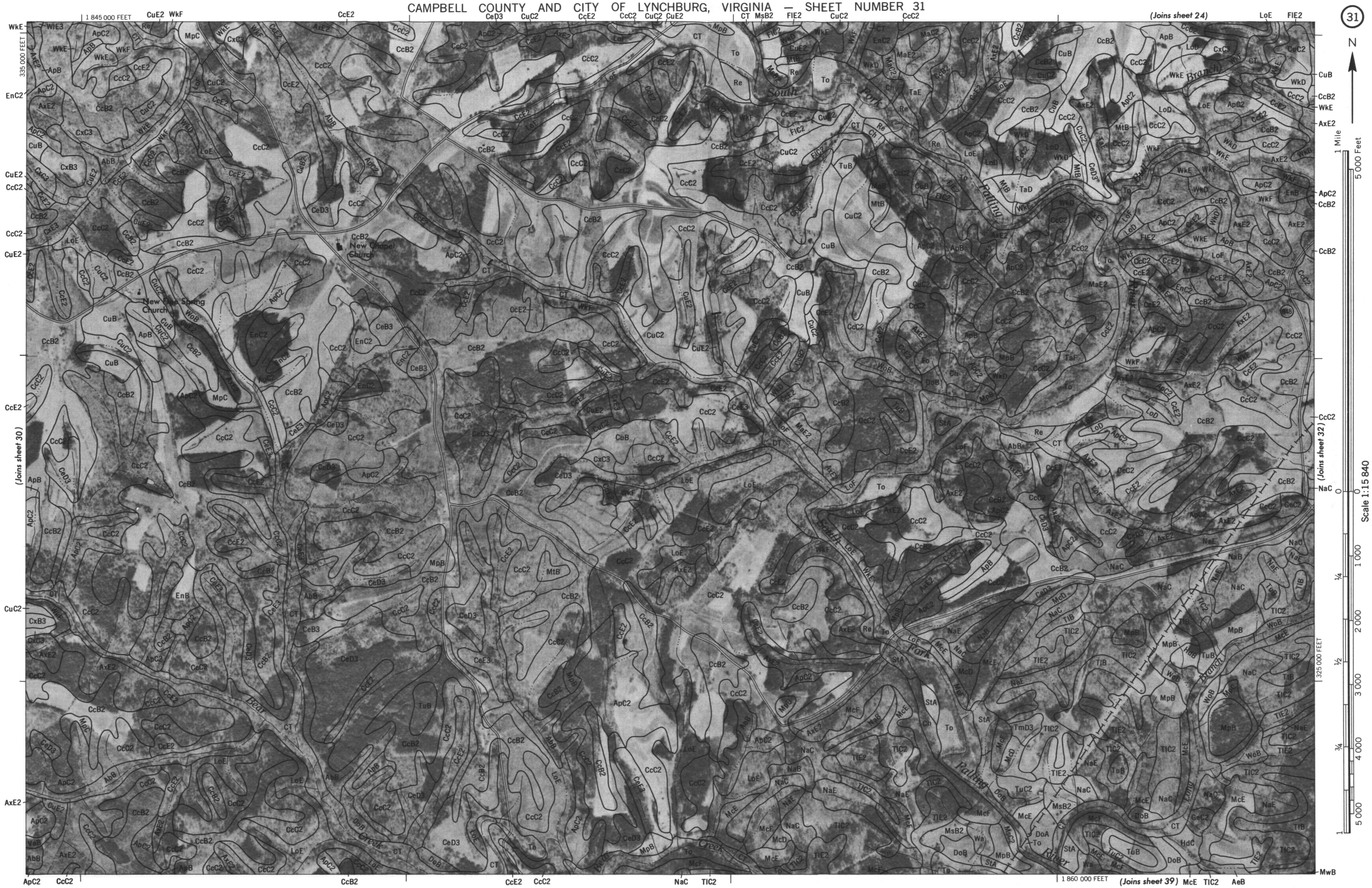
1 825 000 FEET

(Joins sheet 29)

(Joins sheet 31)

(Joins sheet 38)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

32

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 32

N

1 Mile

5 000 Feet

Scale 1:15 840

1 880 000 FEET

335 000 FEET

325 000 FEET

1 865 000 FEET

(Joins sheet 25)

(Joins sheet 31)

(Joins sheet 35)

(Joins sheet 40)

APPOMATTOX COUNTY

Mountain

Oak

Red

Falling

Rattlesnake

Creek

Branch

River

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 885 000 FEET

335 000 FEET

APPOMATTOX COUNTY

Rattlesnake Creek

Peters Creek

Tomahawk Creek

(Joins sheet 32)

(Joins sheet 41)

TIE2

MpB

MCF

1 900 000 FEET

325 000 FEET

1 904 000 FEET

317 000 FEET

(Joins sheet 41)

APPOMATTOX CO

CHARLOTTE COUNTY

1 906 000 FEET

312 000 FEET

2000 AND 5000-FOOT GRID TICKS

33

N

1 Mile

5 000 Feet

Scale 1:15 840

1 5 000
¾ 4 000
½ 3 000
¼ 2 000
0 1 000
0

N

1 Mile

5 000 Feet

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

Scale 1:15 840

1 760 000 FEET

320 000 FEET

310 000 FEET

1 750 000 FEET

(Joins sheet 26)

(Joins sheet 35)

(Joins sheet 42)

Johnson County

Bedford County

Mountain

Creek

Mill Creek

Shiloh Church

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 34)
(Joins sheet 27)
(Joins sheet 36)
(Joins sheet 43)

1 765 000 FEET
320 000 FEET
310 000 FEET
1 780 000 FEET

Johnson Creek
Big Southern Creek
OTTER RIVER
Otter River
Tardy Branch
Flat Creek
Haden Mountain
Troublesome Creek
QUARRY

N

1 Mile
5 000 Feet

Scale 1:15 840

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

1 800 000 FEET

320 000 FEET

310 000 FEET

1 785 000 FEET

(Joins sheet 28)

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 44)

Chapel Grove Church

Liberty Church

Kingston

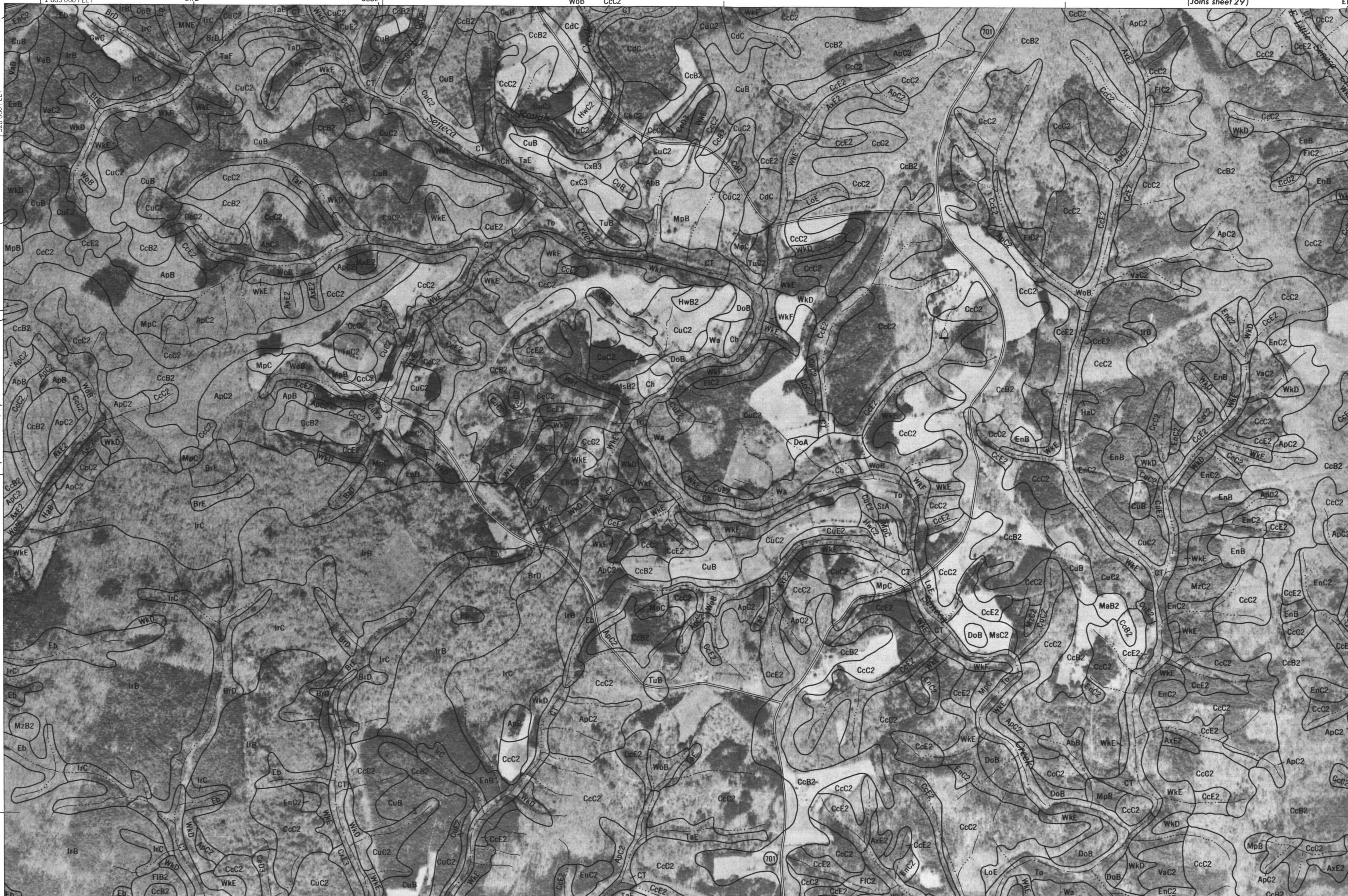
Castle Craig

Creek

37

(Joins sheet 29)

1 805 000 FEET



(Joins sheet 36)

(Joins sheet 38)

(Joins sheet 45)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

0 ¼ ½ ¾ 1

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

39

N

1 Mile

5 000 Feet

Scale 1:15 840

1 845 000 FEET

320 000 FEET

310 000 FEET

1 860 000 FEET

(Joins sheet 38)

(Joins sheet 40)

(Joins sheet 31)

(Joins sheet 47)

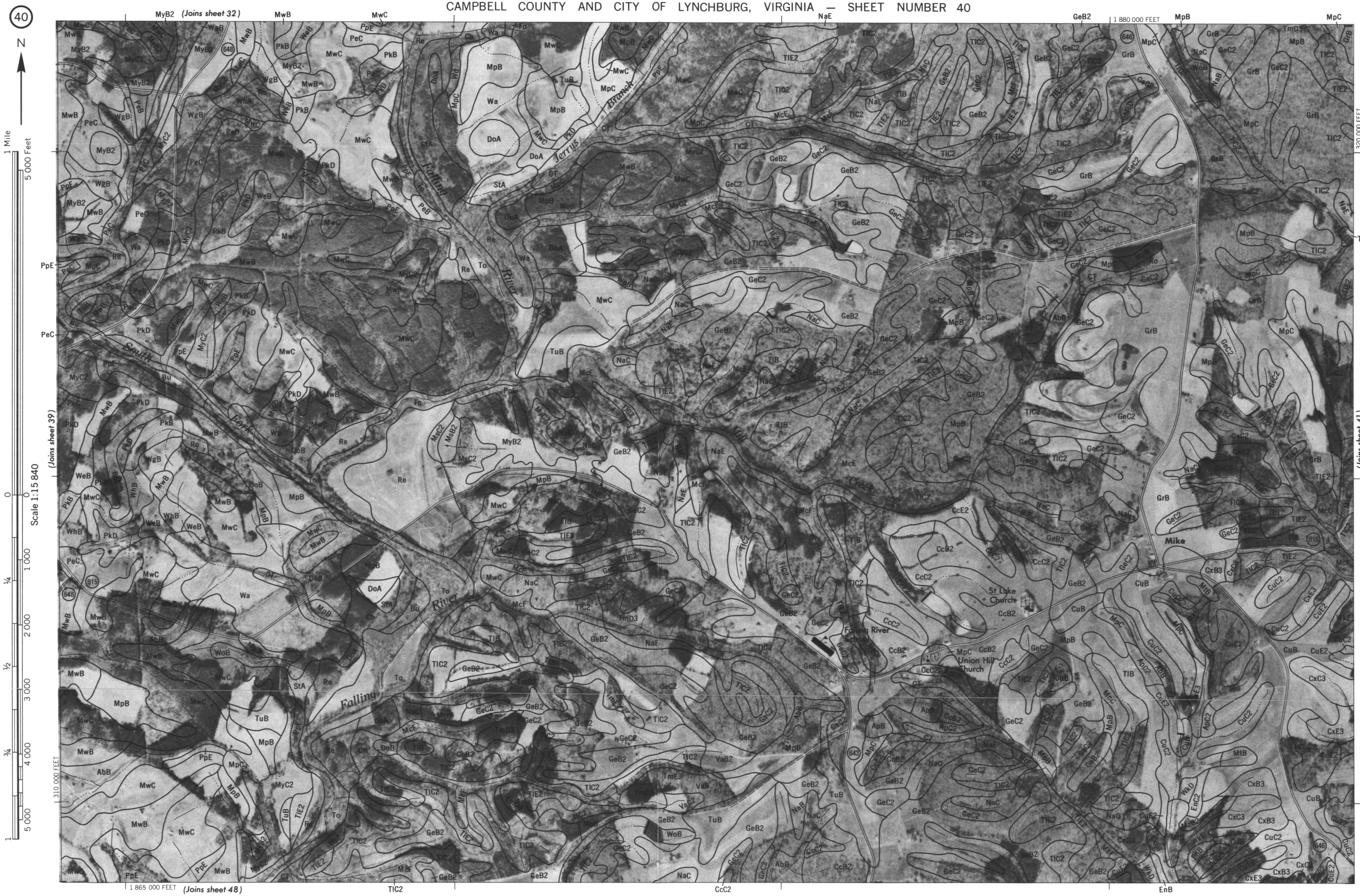
South Fork Falling River

Gravel Ridge

Mollus Creek

Mollus Creek

New Bethel Church



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 885 000 FEET

(Joins sheet 33)

320 000 FEET

(Joins sheet 40)

(Joins sheet 49)

1 900 000 FEET

(Joins inset, sheet 33)

310 000 FEET

AMPOMATTOX COUNTY

CHARLOTTE COUNTY

Falling River

Little Falling River

Jacobs Creek

Lucks Creek

Stanton River

41

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 42

42

N

(Joins sheet 34)

1 760 000 FEET

305 000 FEET

300 000 FEET

1 750 000 FEET

(Joins inset, sheet 50)

(Joins sheet 43)

(Joins sheet 51)

Scale 1:15 840

1 Mile 5 000 Feet 0 0 ¼ 1 000 ½ 2 000 ¾ 3 000 1 4 000 5 000

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 43

(Joins sheet 42)
(Joins sheet 35)
(Joins sheet 44)
(Joins sheet 52)

1 765 000 FEET
305 000 FEET
1 780 000 FEET

Branch
Tardy
Scott Mtn
St Andrews Church
Lynch Station Church
Ulro Vista Elem School
Lynch Station
RIVER
OTTER
SOUTHERN
C.F.L.

N

1 Mile
5 000 Feet

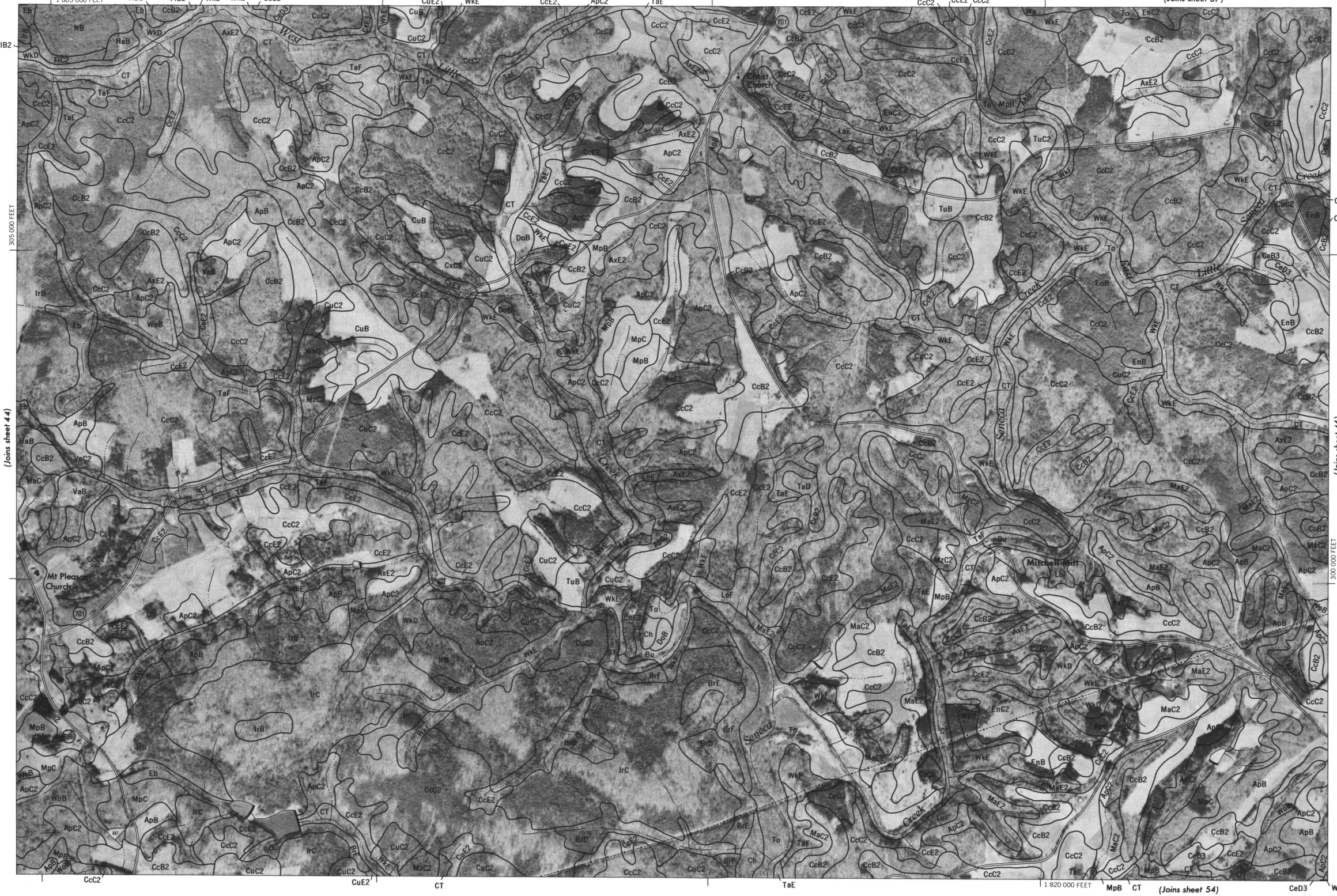
Scale 1:15 840

1/4 0 1/4 1/2 3/4 1 1 000 2 000 3 000 4 000 5 000

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 44

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

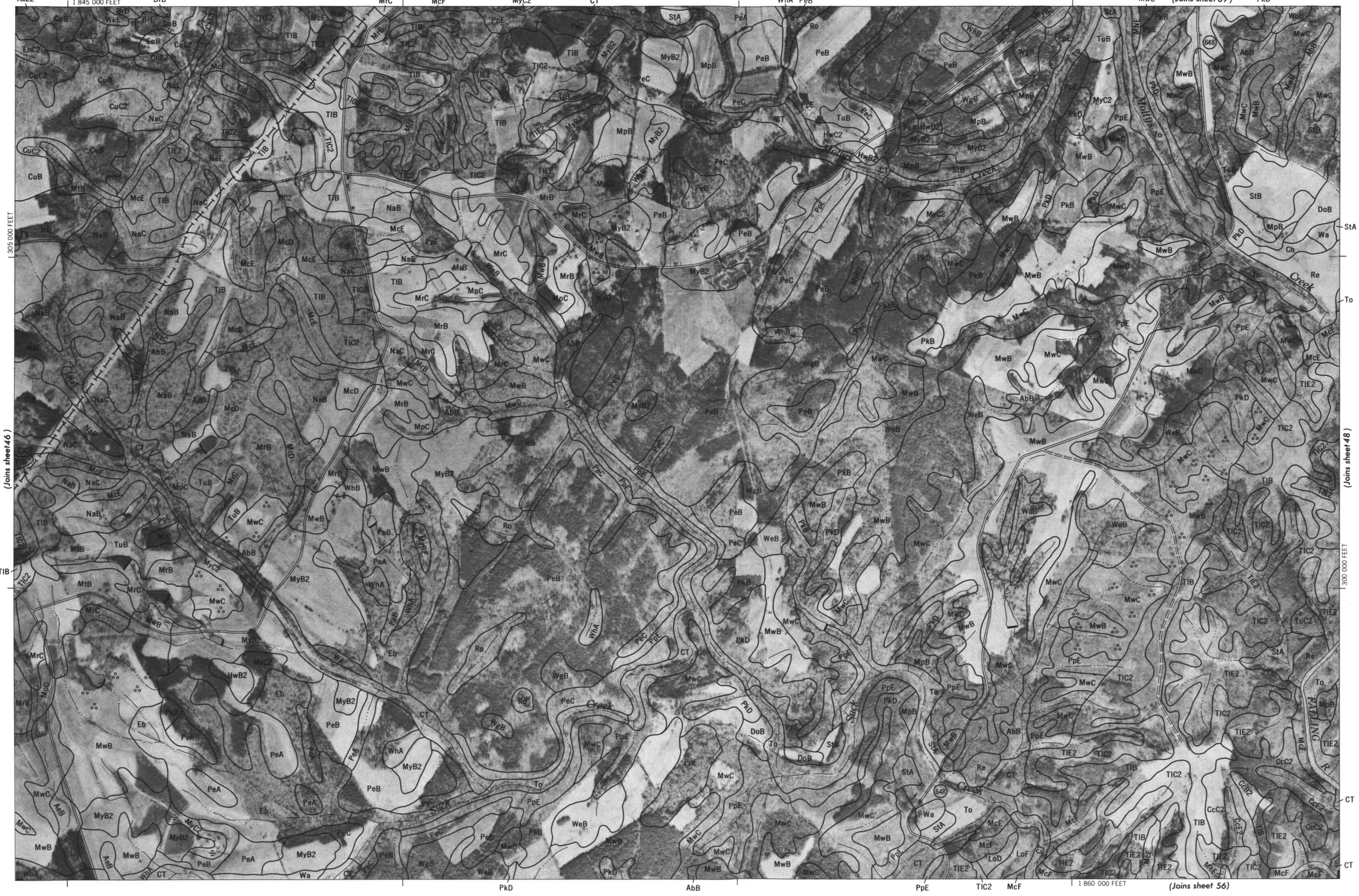
CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 45



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 47



47

N

1 Mile

5 000 Feet

Scale 1:15 840

1 0 1 000 2 000 3 000 4 000 5 000

¼ ½ ¾

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

48

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 40)

(Joins sheet 47)

(Joins sheet 49)

(Joins sheet 57)

1 880 000 FEET

1 865 000 FEET

305 000 FEET

300 000 FEET

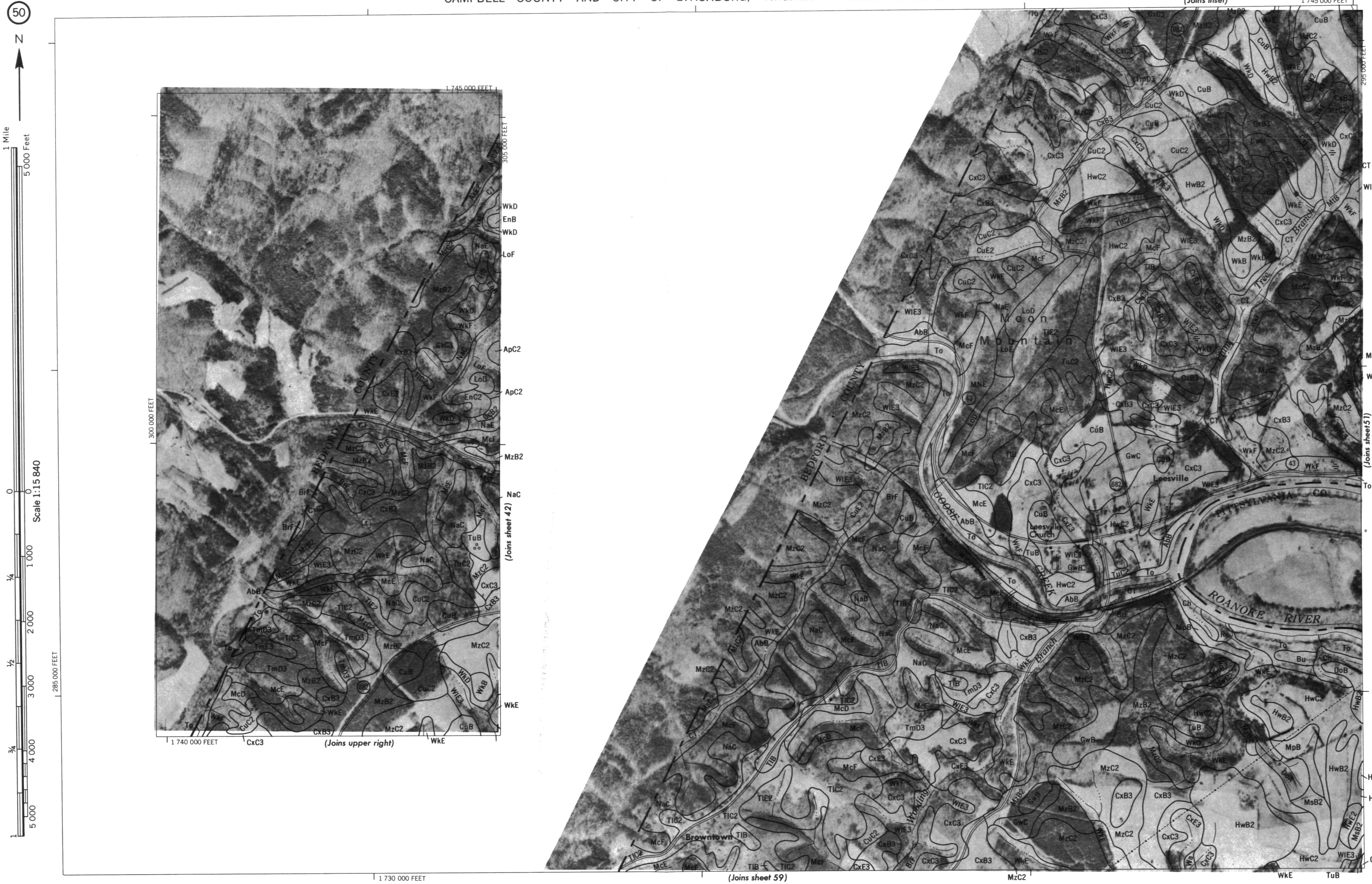
FALLING RIVER

Little Falling

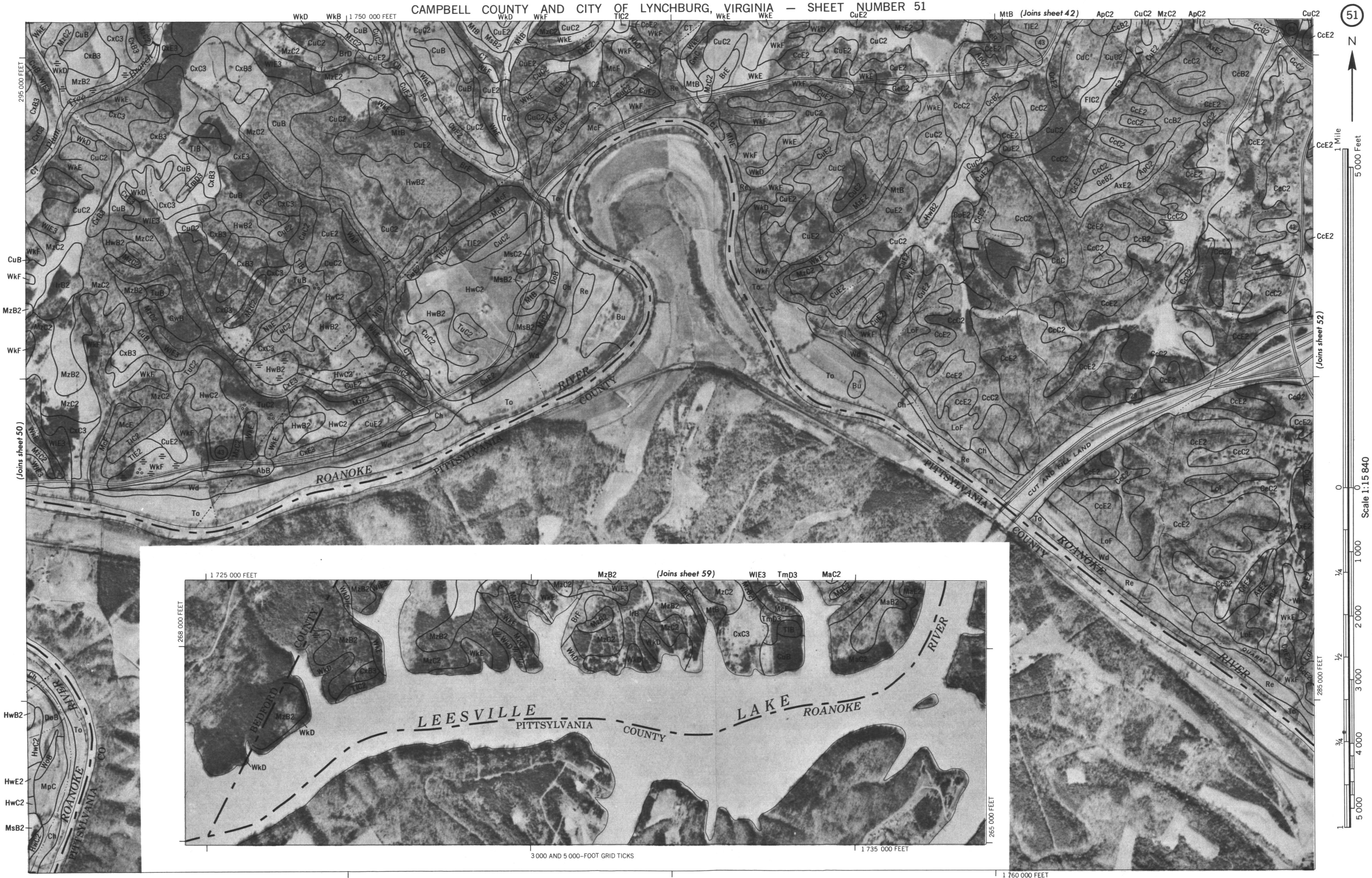
This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 49

1 885 000 FEET (Joins sheet 41)
(Joins sheet 48)
(Joins sheet 58)
1 900 000 FEET
305 000 FEET
300 000 FEET



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 52

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

54

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1/4 1/2 3/4 1

1 000 2 000 3 000 4 000 5 000

(Joins sheet 45)

(Joins sheet 53)

(Joins sheet 55)

(Joins sheet 61)

1 820 000 FEET

1 805 000 FEET

295 000 FEET

285 000 FEET

Seneca Creek

Brown Creek

Hodges

Perrows Chapel

Marvel Hill

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 55

55

N

(Joins sheet 46)

(Joins sheet 54)

(Joins sheet 56)

(Joins sheet 62)

1 825 000 FEET

1 840 000 FEET

295 000 FEET

285 000 FEET

Hill Creek Church

Dry Mountain

Whippinny Creek

Hill Creek

Scale 1:15 840

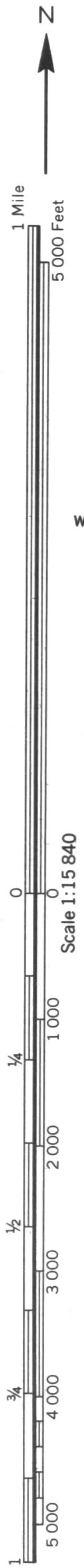
1 Mile

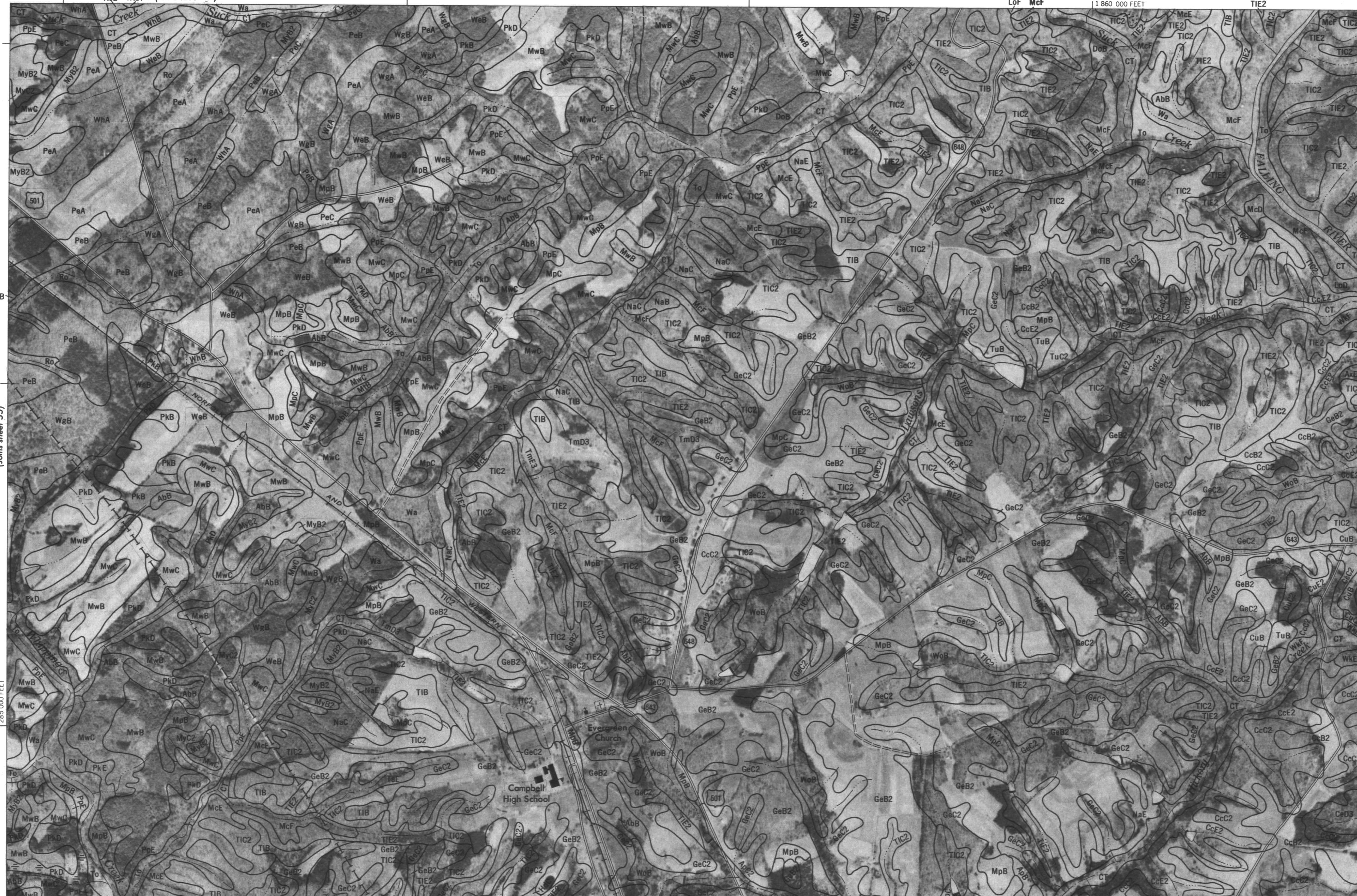
5 000 Feet

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 56

(Joins sheet 47)



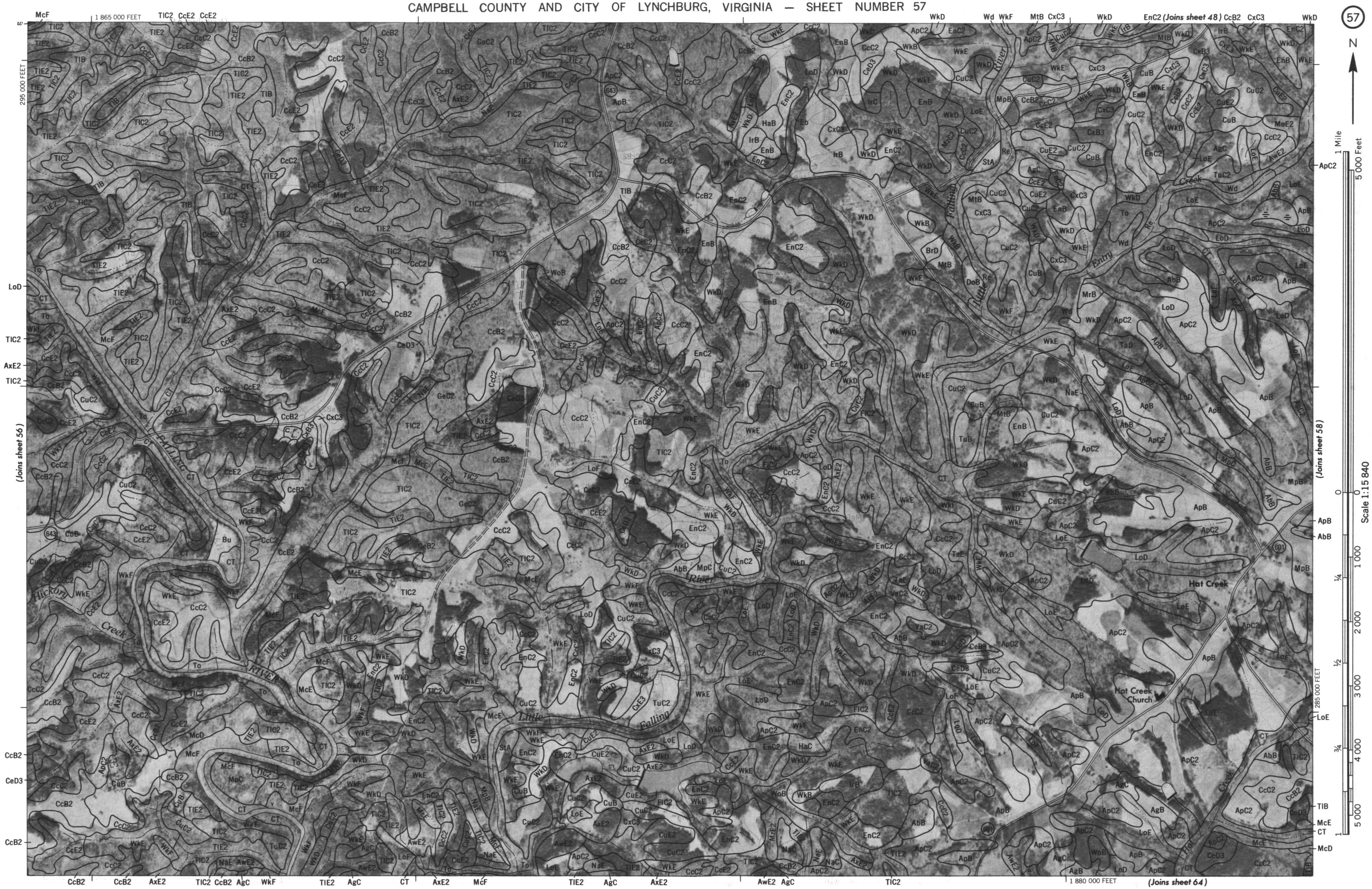


(Joins sheet 55)

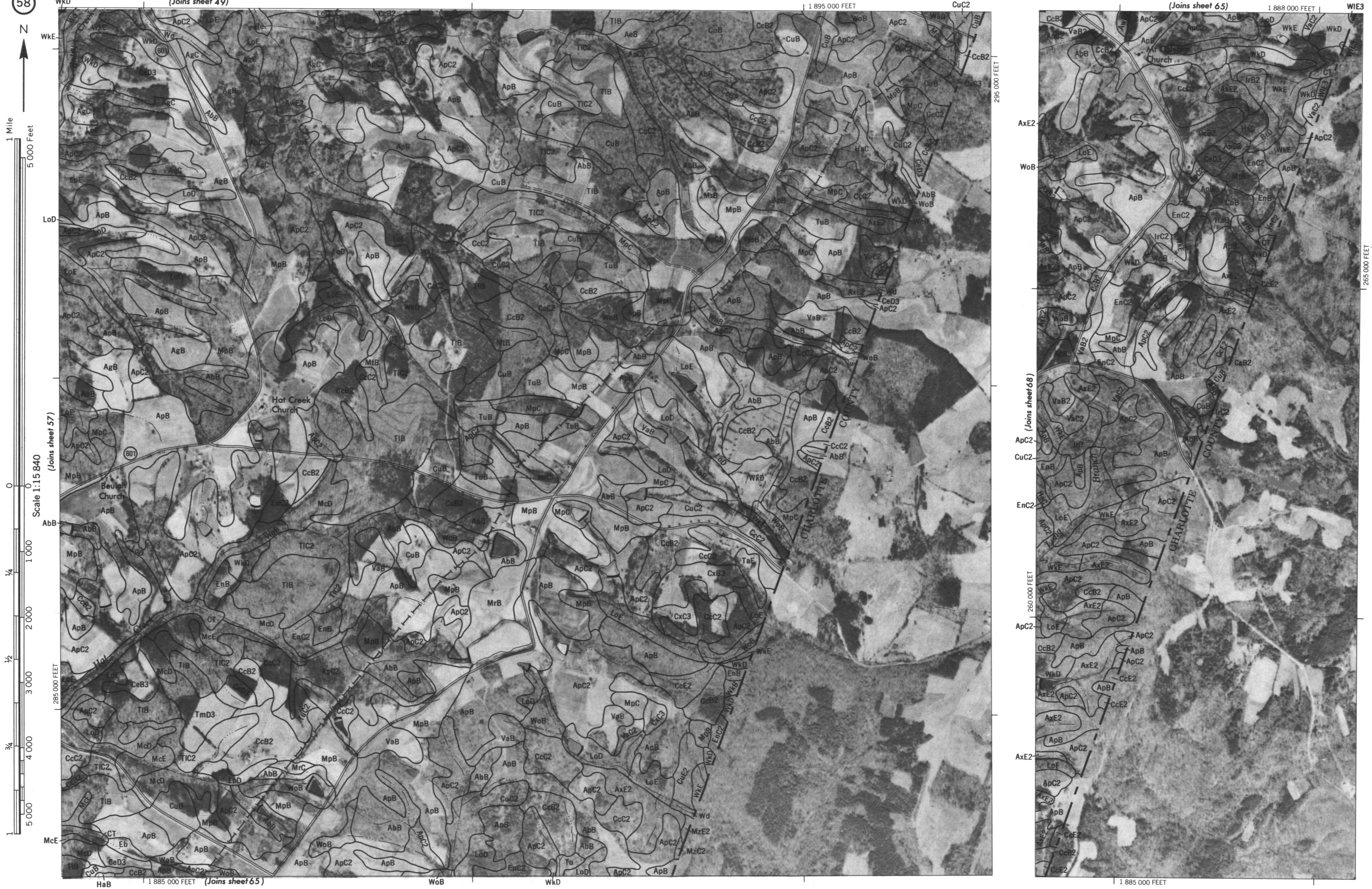
(Joins sheet 57)

(Joins sheet 63)

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3000 AND 5000-FOOT GRID TICKS

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 59

59

1 730 000 FEET

280 000 FEET

(Joins sheet 50)

(Joins ins)

N

1 Mile

5 000 Feet

Scale 1:15 840

RIVER

ROANOKE

COUNTY

PITTSYLVANIA

LAKE

LEESVILLE

DAM

BEDFORD COUNTY

Leesville Lake

(Joins sheet 51)

1 746 000

(Joins upper right)

282 000

280 000

1 747 000

ROANOKE RIVER

PITTSYLVANIA CO

1 000 AND 2000-FOOT GRID TICKS

270 000 FEET

1 745 000 FEET

WkD

WIE3 IrB MzB2 (Joins inset, sheet 51)

TmD3

MaC2 MaE2

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

60

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 60

N

Scale 1:15 840

1 Mile 5 000 Feet

1 785 000 FEET

270 000 FEET

1 795 000 FEET

264 000 FEET

1 800 000 FEET

269 000 FEET

280 000 FEET

(Joins sheet 53)

(Joins sheet 61)

(Joins lower left)

(Joins inset)

(Joins inset, sheet 61)

ROANOKE RIVER

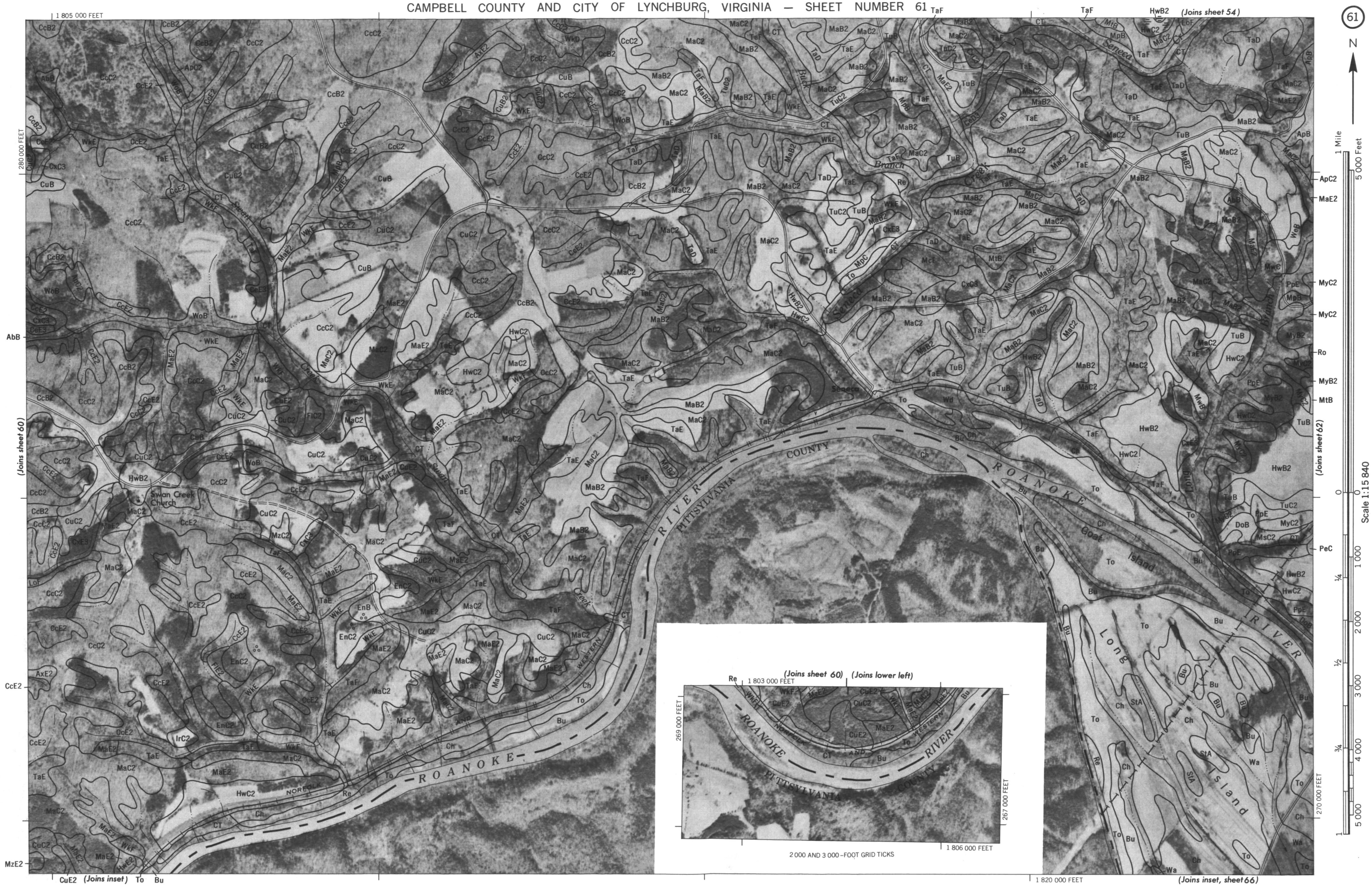
PITTSYLVANIA COUNTY

BROWN MOUNTAIN

Minter Creek

Bethel Church

Toler



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 62

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 63

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

64

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 64

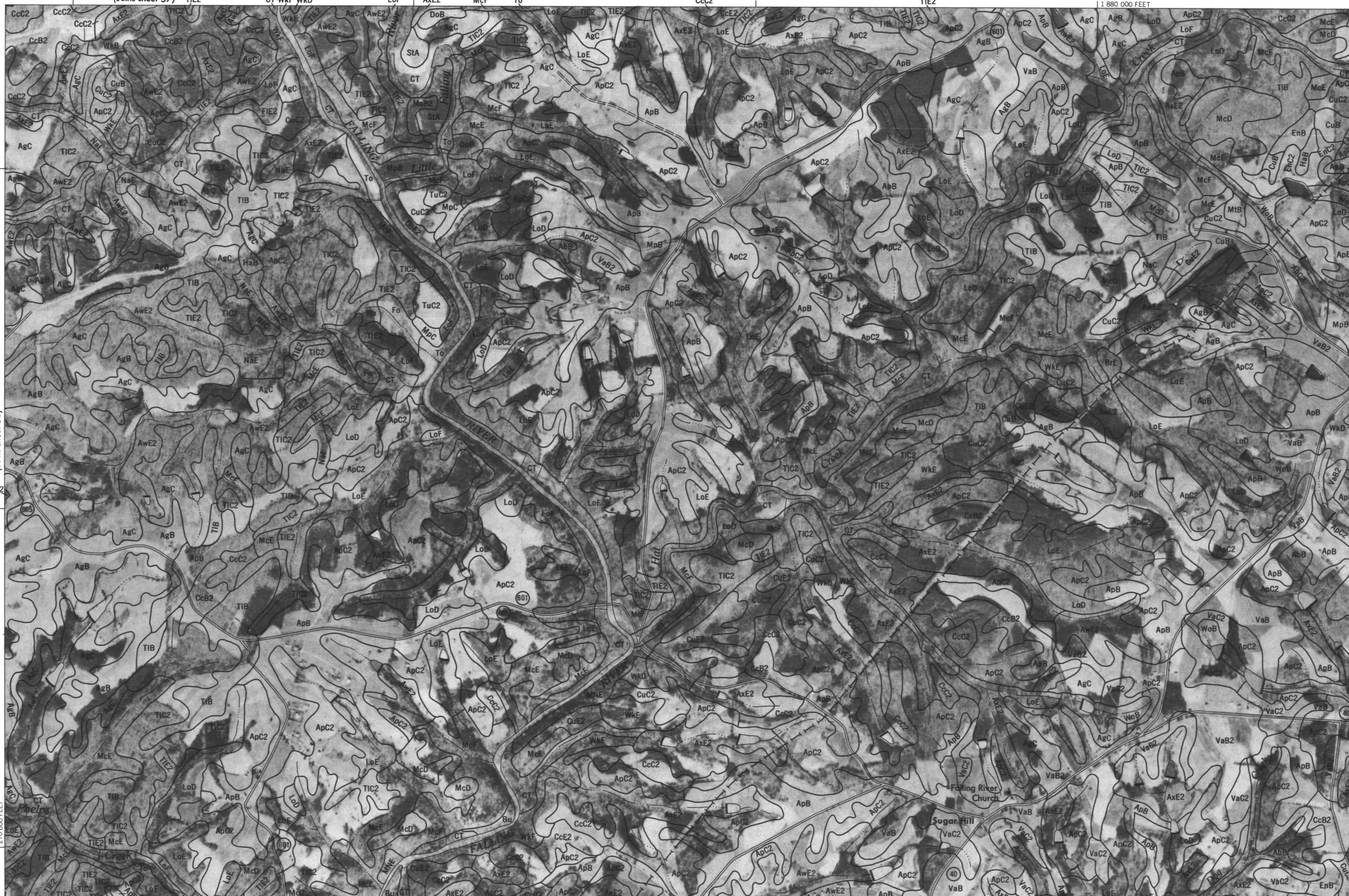
N

1 Mile
5 000 Feet

Scale 1:15 840

0 — ¼ — ½ — ¾ — 1

0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 65

65

N

1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

1/4 1/2 3/4

1 885 000 FEET

280 000 FEET

255 000 FEET

251 000 FEET

270 000 FEET

1 875 000 FEET

1 880 000 FEET

1 900 000 FEET

(Joins sheet 58)

(Joins sheet 64)

(Joins sheet 68)

(Joins inset, sheet 58)

ROANOKE RIVER

HALIFAX COUNTY

CHARLOTTE COUNTY

FALLING RIVER

Long Branch

Norfolk Western

4000 AND 5000-FOOT GRID TICKS

This map is compiled on 1973 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

Scale 1:15 840

1 Mile 5 000 Feet

0 0

¼ 1 000

½ 2 000

¾ 4 000

1 5 000

(Joins sheet 62)

(Joins inset A)

(Joins sheet 67)

(Joins upper left)

1 840 000 FEET

260 000 FEET

265 000 FEET

1 825 000 FEET

Green Hill

Melrose

PITTSYLVANIA COUNTY

HALIFAX COUNTY

ROANOKE RIVER

Islands

Hale

Long Island

INSET A

(Joins sheet 61)

1 824 000 FEET

269 000 FEET

266 000 FEET

1 821 000 FEET

3000 -FOOT GRID TICKS

INSET B

(Joins sheet 67)

1 855 000 FEET

256 000 FEET

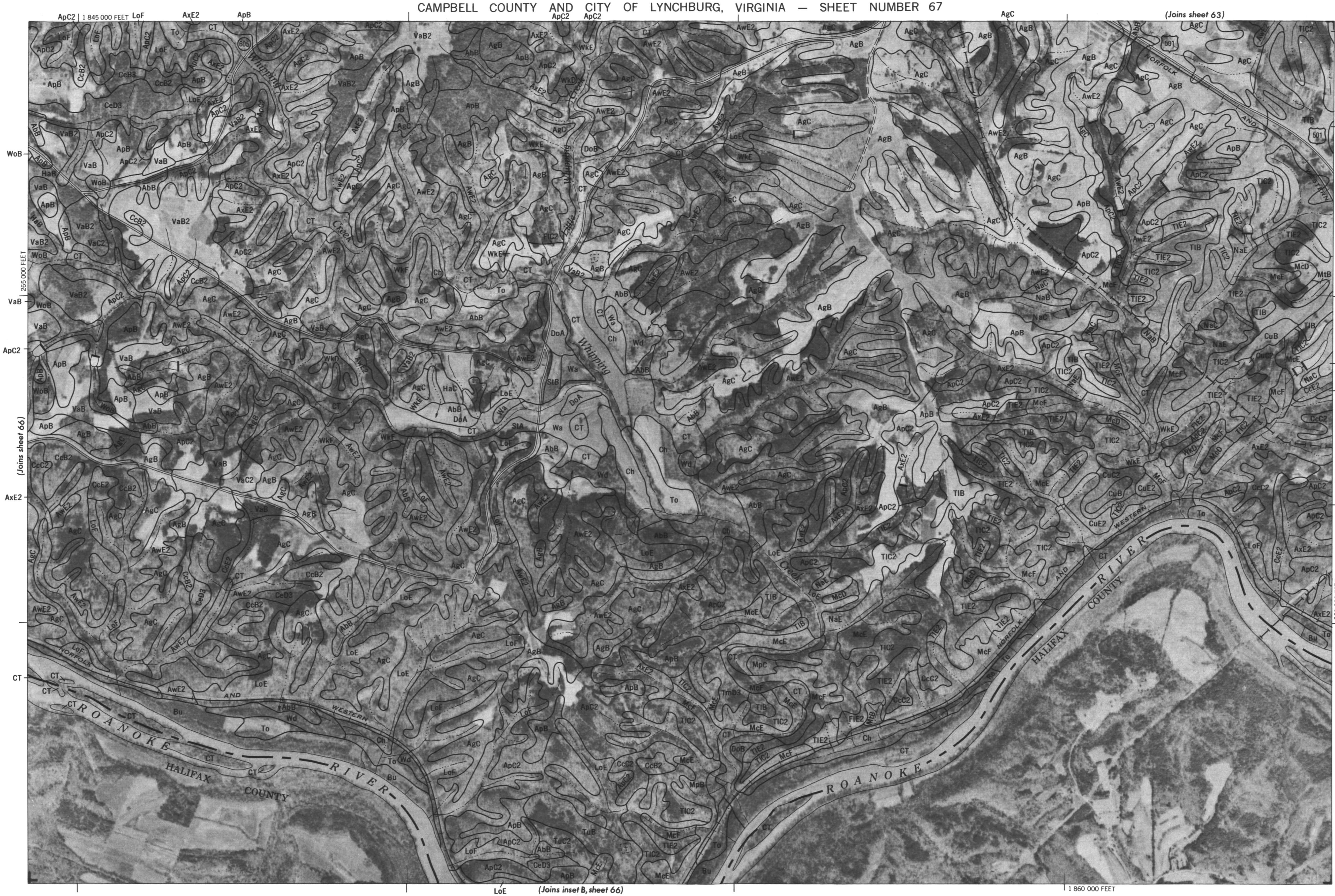
254 000 FEET

1 850 000 FEET

2000 AND 5000-FOOT GRID TICKS

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 63)



(Joins sheet 66)

(Joins sheet 68)

(Joins inset B, sheet 66)

Scale 1:15 840

1 Mile
5 000 Feet

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA — SHEET NUMBER 68

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CAMPBELL COUNTY AND CITY OF LYNCHBURG, VIRGINIA

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Buildings
- School
- Church

Mine and quarry (QU.)

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

Short steep slope

Prominent peak

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stoniness
  - Stony
  - Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Cut and fill land (C.F.L.)
- Cut and fill land, less than 3 acres